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REPORT

OF THE

PHILIPPINE COMMISSION

TO

THE PRESIDENT.

VOL. III.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1901.

235723

LETTER OF TRANSMITTAL.

To the President.

SIR: We have the honor to transmit to you herewith Volumes III and IV, together with the accompanying atlas of the Philippine Islands, being the final volumes of the report to you of this commission.

Very respectfully, yours,

JACOB GOULD SCHURMANN,
GEORGE DEWEY,
ELWELL S. OTIS,
CHARLES DENBY,
DEAN C. WORCESTER,
Commissioners.

JOHN R. MACARTHUR,
Secretary and Counsel.
DECEMBER 20, 1900.

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PAPER NO. I.

CHOROGRAPHY.

PROLOGUE.

It was proposed in the beginning simply to reproduce in this collection of papers the chorography of the Philippines by P. Beranaria (Society of Jesus), judging it to be the best of all published up to the present time; but considering the resulting size of the last parts of the physical geography—that is to say, the orography, the hydrography, and the climatology, which were simply mentioned in the geography of this author—it was deemed best to amplify the present treatise on chorography. In the composition of this paper we have made use of the most recent work;[1] that is to say, the last volume of the Official Guide of the Philippines, published in 1898, the Spanish-American Encyclopedic Dictionary, and several memoirs and articles relating to the Philippines, written by persons acquainted with the country.

We have found marked discrepancies among the various authors who have written upon the chorography of the Philippines in three points: First, in geodetic measurements and measurements of areas and the census of the various islands, cities, towns, and of the various races, and in the spelling or orthography of the names of islands, towns, mountains, rivers, etc. In regard to measurements we have generally accepted those published by the Geographical Institute of Madrid. In regard to census we have given the preference to the data found in the most recent parochial books of registry, they seeming to us the truest sources of exact information in this matter. In regard to orthography of proper names we have adopted that which seemed to us most generally accepted and correct, consulting in doubtful cases the pronunciation of the natives, who, however, do not always seem to be in accord. The only recourse seems to be to use that orthography which agrees best with the tendencies of the dialects or languages spoken in the regions, towns, or islands where doubtful orthography pertains.

The chorographic data relative to civil, military, and ecclesiastical organizations which existed before the 1st of May, 1898, have been united in the introduction, not alone to avoid repetition in the partial chorographic descriptions of each region, but because they no longer exist at the present time on account of the change of sovereignty in the islands.

OBSERVATORY OF MANILA,
December 8, 1899.

[1]The data in reference to the Visayas, Mindanao, and Jolo we owe in large part to the diligence of Padre Baltazar Ferrer, S. J., of the Observatory of Manila.

INTRODUCTION.

SITUATION AND BOUNDARIES OF THE PHILIPPINE ARCHIPELAGO.

The Philippine-Archipelago is a group composed of many islands situated in the most northern part of the great Asiatic archipelago, within the North Torrid Zone, between 4° 4′ and 20° 3′ north latitude and 116° 4′ and 126° 34′ east longitude from the meridian of Greenwich. It is surrounded on the north and west by the China Sea, on the east by the Pacific Ocean, and on the south by the Sea of Celebes. From the extreme point of land on the northeast to the China coast is a distance of 630 kilometers. The nearest land on the north is the island of Formosa, on the east the Palaos Islands, on the southeast the Molucca Archipelago, on the south the island of Celebes, on the southwest the island of Borneo, and on the west Cochin China.

The waters which surround it are very deep, not far from the east coast the Pacific being from 4,000 to 6,000 meters in depth. The Jolo Sea, between Mindanao and Jolo, reaches a depth of 4,069 meters, off the Celebes 3,750 to 4,755, and not far from the south coast of Mindanao the depth reaches 5,000 meters; nevertheless, the Philippines are united to the Asiatic archipelago at three points where the straits filled with islands reach but little depth, namely, north of Borneo by the islands of Balabac and Paragua, on the northeast of Borneo by the Jolo group, and on the northeast of Celebes by the islands of Sanguir and Talut. Without doubt, therefore, the whole of the Philippine Archipelago belongs to the same geographical region as Borneo, Sumatra, Java, and the rest of the islands of the great Asiatic archipelago, and in consequence to Asia rather than to Oceania. Considering, therefore, only geographical reasons, it is sufficient to note the analogy which the situation of the Sunda Islands, the Celebes, the Moluccas, and the Philippines bear to Asia and that which the Antilles bear to America. The former bound the interior China and Sunda seas, the latter the Mexican and Caribbean seas, bathing, respectively, the Asiatic and American coasts. According to this analogy, therefore, if the latter belong to America the former belong to Asia.

ISLANDS WHICH FORM THE ARCHIPELAGO.

It is believed that the number of islands exceeds 1,400, although in truth up to the present time no one can state the exact number. For greater clearness and system in that which is to be said in this paper, we shall consider the archipelago divided into the following parts or regions:

First. Luzon and the contiguous islands.[1]
Second. The principal islands adjacent to Luzon.
Third. The Visayan Islands and those adjacent to them.
Fourth. Mindanao and the adjacent islands.

[1] Spanish-American Encyclopædic Dictionary, vol. VIII, p. 371.

Fifth. The Jolo group.

Sixth. Paragua, Dumaran, and Balabac, and the islands adjacent to them.

AREA, GEOGRAPHICAL POSITION, TERRITORIAL DIVISION, NUMBER OF INHABITANTS, AND DENSITY OF POPULATION.

We take the data in regard to the territorial division, area, and number of inhabitants from the corresponding volume of the census of the population of Spain, according to the official census made December 31, 1887, and published in 1891 by the Institute of Geography and Statistics, conforming thus to the division already given. This data is at the present time but relative in regard to the census.

Geographical situation.

Provinces, districts, and islands.	Latitude north.				Longitude east of Greenwich.				Area in square kilometers.	Population.	Population per square kilometer (density of population).
	From—		To—		From—		To—				
LUZON.	°	′	°	′	°	′	°	′			
Cagayan and Palani Islands	17	4	18	6	120	9	122	2	13,968	96,357	6.9
Ilocos, north	17	6	16	6	120	4	121		3,328	163,349	49.1
Abra	17	1	18		120	4	121		2,837	41,318	14.6
Ilocos, south	16	9	17	9	120	3	120	7	1,424	178,258	126.2
Isabela	16		17	5	121	3	122	2	14,234	48,302	3.4
Bontoc	17	1	17	4	120	9	121	4	1,322	13,985	10.6
Lepanto *a*	16	7	17	3	120	6	121	2	2,690	23,945	8.9
Nueva Vizcaya	16	1	17	1	120	8	121	5	4,384	19,379	4.4
Union	16	1	16	9	120	2	120	7	2,008	110,064	54.8
Benguet	16	1	16	9	120	4	120	9	2,416	15,734	6.5
Zambales	14	7	16	4	119	7	120	5	2,229	87,275	39.2
Principe	15	6	16	3	121	2	122	2	3,051	4,198	1.4
Pangasinan	15	7	16	2	120		120	9	2,854	302,178	105.9
Nueva Ecija	15	2	16	1	120	5	121	5	6,610	156,610	23.7
Carlac	15	2	15	8	120	1	120	7	*b* 5,363	89,339	39.2
Pampanga	14	8	15	3	120	3	121	9	2,208	223,902	101.4
Bulacan	14	6	15	3	120	6	121	4	2,965	239,221	80.7
Bataan	14	4	14	9	120	2	120	6	1,264	50,781	40.2
Manila	14	3	14	8	120	9	121	1	672	*c* 300,392	447
Morong and Calim	14	2	14	8	121		121	5	1,656	46,940	28.3
Infanta and adjacent islands	14	3	14	7	121	2	121	7	2,194	7,100	3.2
La Laguna and Laguna de Bay	13	8	14	7	121		121	6	2,603	169,983	65.3
Tayabas and adjacent islands	13	2	14	6	121	2	122	8	5,893	109,780	18.6
Batangas, Laguna, and adjacent islands	13	6	14	2	120	5	121	4	3,130	311,180	99.4
Ambos Camarines and adjacent islands	13	2	14	2	122	2	123	9	7,897	194,022	24.6
Cavite and Corregidor	14	6	14	1	120	6	121		1,354	135,053	99.7
Albay, Catanduanes, and adjacent islands	12	8	13	5	123	2	124		4,123	195,129	47.3
Sorsogon	12	5	13	2	123	8	124	1	1,954	98,650	50.5
PRINCIPAL ISLANDS ADJACENT TO LUZON.											
Archipelago of Batanes and Babuyanes *d*	18	8	21		121	2	121		620	10,517	17.0
Mindoro and adjacent islands:											
Lubang, Bugayao, Iling, Marinduque, Semerara, Sibay and Caluya	12	2	13	5	120	3	121	5	10,167	67,656	6 7
Burias	12	7	13	2	122	9	123	4	*e* 508	1,708	2.4
Masbate and Ticao *e*	11	7	12	7	123	1	124	1	3,897	21,366	5.5
Archipelago of Calamianes and of Cuyos *d*	10	7	12	3	119	7	121	2	1,600	14,291	8.9

a We include data in regard to the comandancia of Tiagan, the same in regard to the comandancias included in the other provinces.

b There is probably an error in these numbers. The number given by Padre Baranera is probably more correct—2,277 square kilometers.

c This number is actually considerably greater.

d Including all the group.

e There must be an error in this number. We adopt the number published in the treatise on orography—720 square kilometers.

Geological situation—Continued.

Provinces, districts and islands.	Latitude north.		Longitude east of Greenwich.		Area in square kilometers.	Population.	Population per square kilometer (density of population).
	From—	To—	From—	To—			
VISAYAS.	° ′	° ′	° ′	° ′			
Panay and adjacent islands:							
Antique and Cagayan						115,434	
Capiz, Calaguan, Gigantes, Sicogón and Carabao							
Iloilo, Guimarás, Hampulugán, Malagaban, Pan de Azucar, Cagabanjan, Cagu, etc	10 4	11 9	121 8	123 2	13,538	194,890	54.8
						432,462	
Bohol and adjacent islands (Bohol, Minoco, Pinigan or Lapinig, Panglao or Danis, Siquijor or Iuegos)	9 6	10 2	123 7	124 6	3,528	224,965	63.8
Cebú and adjacent islands (Cebú, Bantayán, Guintacán, Mactán, Malapascua and Olangó)	9 4	11 3	123 3	124 6	6,582	504,076	76.6
Negros	9 1	11 0	122 4	123 6	9,341	a 242,433	39.8
Sámar and adjacent islands (Sámar, Balicuatro, Batag Capul, Dalupirit or Puercos, Tamonjol or Malhon, Saguan or Lavang or Calamutang, Mauiconi, Parasán, Buad Los Naranjos Mesa, Cagapula, and Limbaucauayan)	10 9	12 7	124 3	125 8	13,471	185,386	13.8
Leyte and adjacent islands (Leyte, Biliran, Calunnagán, Limasua, Camotes, Carnasa, Gigantagan, Marípipi, Panaon, etc.)	10	11 6	124 3	125 3	9,976	270,491	27.1
Romblón and adjacent islands (Romblón, Banton, Maestre de Campo, Sibuyan, Simara, Tablas, and adjacent islands) b	12 2	13 1	121 7	122 6	1,278	34,828	27.3
MINDANAO AND ADJACENT ISLANDS.							
Surigao and adjacent islands (Bucos, Dinagat, Hinatuan, Guipoo, Siargao, Sibunga, and various islands)	6 8	9 8	125 1	126 6		67,760	
Misamis and adjacent islands (Camaguin, Silina, and two islands)	7 3	9 1	122 2	125 4		116,024	
Zamboanga and adjacent islands (Malinipa, Olutanga, Santa Cruz, Tigtauan, and Tumalustan)	6 8	8 1	121 9	123 3	99,450	17,199	2.1
Cottabato and Bongo	6 3	8 0	123 2	125 2		4,138	
Davao and adjacent islands (Sámal, Malipano, Talicud, Sarangani, and various islands)	5 6	7 8	123 9	126 3		3,966	
Basilan and adjacent islands (Basilan group)	6 4	6 8	121 6	122 3	1,275	1,119	.9
JOLO ARCHIPELAGO.							
First group—Balanguigui: 14 islands, 7 deserted							
Second group—Jolo: 13 islands, 7 uninhabited							
Third group—Recuaponsón: 8 islands, almost all deserted							
Fourth group—Panguratán: 23 islands, 12 deserted	4 5	6 4	119 3	121 4	1,765	2,896	1.6
Fifth group—Tagbabas: 14 islands, deserted							
Sixth group—Tawitawi: 42 islands, 30 deserted c							
Paragua and Dumaran	8 3	11 5	117 1	119 7	14,584	5,985	.4
Balabac	7 8	8 2	116 8	117 1	360	2,110	5.9

a The number of inhabitants is actually much greater—according to the last official guide 372,001.
b Including all the islands of the group.
c Some reduce these six groups to four.

OBSERVATIONS IN REGARD TO THE NUMBER OF INHABITANTS.

In regard to the number of inhabitants, which, according to the previous statistics, reaches 5,985,124, it is necessary to observe that these statistics treat only of the inhabitants recorded in some way or other in civil records; in the parochial records, verified by greater time, there appears a larger number than in the civil census—differences due in part to the greater or less number of omissions, and to the more or less perfect knowledge of the number of pagans. It should be taken into account that this includes the number of inhabitants in the various islands and provinces. In an examination finished the latter part of 1894 it appears that the population of the various islands included in the general government of the Philippines is formed as follows:

Population according to the parochial records	6,414,373
Omissions and absentees (2 per cent)	123,237
Clergy	2,651
Military	13,640
Navy	3,459
Carbineers (coast and customs guard)	440
Civil guard	3,561
Veteran civil guard	413
Inmates of asylums	689
Convicts	702
Foreigners:	
Chinese, registered[1]	49,696
Absentees	24,848
Europeans, Americans, and others	1,000
Moros:	
Paragua and Jolo Archipelago	100,000
Mindanao and Basilan	209,000
Pagans in Philippines:	
Subjugated	138,000
Independent tribes	692,000
Total	7,782,759

This number, however, seems to be very near to the truth, even if it is reduced on account of omissions, absentees, Moros, and pagans, who do not appear in the official census. There would have been a very slight increase in the population from 1877 to 1894, but, as the archbishop noted in 1887, the preceding ten years were full of calamities for the Philippines, so that the total annual increase was about eight-tenths of 1 per cent, and from that time until 1894, inclusive, the archipelago has likewise suffered serious misfortunes, among which should be recorded epidemics of cholera, influenza, and smallpox. It is to be noted likewise, in regard to the political civil divisions of Luzon, that in certain of the provinces or districts mentioned there have recently been formed politico-military comandancias, which are briefly enumerated to complete the list.

NEW COMANDANCIAS.

Apayaos, situated to the north of the province of Cagayan de Luzon. Cabugaoan, likewise in the north of Luzon, is situated to the east of the comandancia of Apayaos.

[1] According to the data in the office of the secretary of the archbishop of Manila, at the beginning of the year 1898 the population estimated by the parochial priests was 6,559,998, according to which the sum total would be 7,928,384.

Amburayan, situated between the districts of Benguet, Tiagan, Lepanto, and the provinces of South Ilocos and Union.

Itaves, between the provinces of Cagayan and Isabela.

Binatangan, on the east coast of the Island of Luzon, between Isabela and the district of Principe.

Saltan, in the province of Isabela.

Llavac, likewise in the province of Isabela.

Cayapa, created in 1891, in the island of Luzon, near the River Ambayan, near the province of Nueva Viscaya.

Quiangan, just to the west of Lepanto.

The area of these comandancias, and the number of inhabitants included in the area, are included in the provinces or districts in which they are found.

We shall now take up the chorography of each of the aforementioned islands, provinces, and districts, allowing them space proportionate to their importance; giving, first, a general description of the island, its geographical situation, its area, and treating briefly the number and character of its inhabitants and its politico-civil division into provinces, districts, and comandancias; afterwards, if the island is a large one, we shall divide it into various regions, discussing these individually, beginning with those found farthest to the north, and continuing to follow this plan according to the atlas of the Philippines. We shall leave out hydrographic and orographic descriptions, which the reader will find in the papers on hydrography and orography, confining ourselves especially to what may be called the politico-civil chorography, without omitting the data, and physical geography, which is not especially discussed in the other papers, such as the geographical situations, dialects, or languages of the inhabitants, industries and products of the different islands of the provinces.

MILITARY ORGANIZATION.

THE ARMY OF THE PHILIPPINES.

The army of the Philippines was composed of infantry, cavalry, artillery, engineers, the civil guard, and the coast guard. There existed also the executive branches of the sanitary and veterinary departments of equitation, the auxiliaries of the military offices, and the military clergy. For the organization and control of these forces there were a captain-general and various departments, as follows: Infantry, cavalry, civil guard, artillery, engineers, and that of army sanitation, together with an administrative body from the army, and military clergy. At the beginning of the year 1898 there existed the following divisions of operations: Mindanao, under the command of a general of division, the brigades Iligan and Jolo, the general comandancia of Manila and Morong, and that of Laguna and Batangas, that of Cavite, and various flying columns which operated in other parts of the archipelago, commanded by generals of brigades or by colonels.

NAVAL FORCES.

GENERAL ORGANIZATION OF THE NAVY.

The naval forces of the archipelago comprised the naval station and a squadron. The immediate commander of both of these was the general commandant of the dockyard and fleet, a position held by a rear-

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FORCES.

IZATION OF THE NAVY.

elago comprised the naval station and mander of both of these was the gen- d and fleet on held by a rear-

admiral of the navy. The naval station and its various branches and departments assumed direction of all affairs of this branch. The fleet had charge of the inspection, vigilance, and defense of the waters and coasts of the islands. The archipelago was divided into naval districts, at the head of which there was a commandant of varying rank, according to the importance of the district, who exercised at the same time the duties of harbor master of the most important port in his jurisdiction. The naval station included all necessary branches, with an arsenal established at Cavite, another in construction at Subig (Olongapo), a dry dock in Isabela de Basilan, and a dock at Pollok equipped with the necessary machine shops. The command of the naval station of the Philippines was held by a rear-admiral of the navy, who had at his order a general staff for the naval districts and one for the fleet. The next in command of the naval station was a captain of the navy of the first class, who was at the same time commandant of the arsenal at Cavite. The commandant was assisted by a captain of the navy of the economic board, composed of the leading officers of each branch, and the auditor's department, which assisted in all matters of justice.

DEPENDENCIES OF THE NAVAL STATION.

The general board of the navy, composed of chiefs and officers who exercised command either in the naval station or on ships of the fleet; the engineering corps of the navy, represented by a chief engineer and two other officers of that body; the corps of the artillery of the navy, in command of a commandant or lieutenant-colonel; the administrative board, composed of a deputy of the navy, the comptroller, and the accountants of the navy; the marine infantry, commanded by a lieutenant-colonel, composed of disembarking forces and companies; arsenal guards; the sanitary department of the navy, at the head of which there was a subinspector of the first class; the ecclesiastical corps of the navy; the judge-advocate's corps of the navy, which was formed of the auditor and the attorney and four assistants; the naval forces, composed of the ships' fleet, the comandancias of the navy, which were those of Manila and Iloilo, and depending upon those the districts of Pangasinan, Ilocos, Aparri, Marianas, the Caroline Islands, and Leyte, and the comandancia of the naval division of the south, and depending upon these the divisions and districts of Mindanao and Isabela.

THE FLEET.

The fleet was composed of the following vessels:

Two cruisers of the first class—the *Reina Cristina* and the *Castilla*.

Two protected cruisers of the second class—*Isla de Luzón* and *Isla de Cuba*.

Three cruisers of the second class—the *Velasco*, the *Don Juan de Austria*, and the *Don Antonio de Ulloa*.

Three cruisers of the third class—*Marques del Duero*, *Elcano*, and *General Lezo*.

Two gunboats of the first class—*Quiros* and *Villalobos*.

Three transports—*Manila*, *Cebu*, and *General Alava*.

One steamer of the hydrographic commission—the *Argos*.

Thirteen gunboats of the second class—*Calamianes*, *Paragua*, *Samar*, *Leyte*, *Bulusan*, *Mariveles*, *Arayat*, *Pampanga*, *Albay*, *Manileno*, *Mindoro*, *Panay*, *Callao*, and *Mindanao*.

Four gunboats of the third class—*Otalora*, *Urdaneta*, *Basco*, and *Gardoqui*.

Four armed steam launches—*Corcuera*, *Almonte*, *Lanao*, and *General Blanco*.

One tug—*Rápido*.

Three steam launches and two others for the exclusive use of the commander in chief and the arsenal of Cavite, without counting those which were at Yap and at Isabela de Basilan.

The marine infantry force of the station was as follows:

A colonel (subinspector), a lieutenant-colonel of the first class, and the other chiefs and officers who formed the second battalion of the first regiment of this archipelago; also the company of arsenal guards who garrisoned Cavite and Subig.

CHAPTER I.

LUZON.

GEOGRAPHICAL SITUATION.

Luzon, the largest and most northern of the islands of the Philippine Archipelago, is situated between latitude 12° 32′ and 18° 39′ north and longitude 119° 42′ and 124° 8′ east from Greenwich. In form it is very irregular, elongated from north to south and southeast, much wider at the north than at the south. It narrows very much at 14° 30′, where the Bay of Manila is situated; and very much more at 14°, where a narrow isthmus unites the larger and western part of the island with the eastern.

SHAPE OF ISLAND.

The coast of Luzon[1] presents a great number of irregularities. There is near the center and on the south, where there are large bays, excellent ports and harbors. From Point Negra, at the extreme northwest of the island, the coast extends southwest to Cape Bojeador; it then turns to the south southeast and south southwest, and continues in this direction as far as Point Dile. In all of this part, of approximately 1°—Cape Bojeador being 18° 30′ and Point Dile being 17° 34′—is found the Bay of Dirique, the bar of Cauit, Point Culili, Port Currimao, the Gulf of Gan, the island of Badoc, and Point Solot, all belonging to the coast of the province of North Ilocos. The island and port of Salomague and the island of Pinget belong to the coast of the province of South Ilocos.

At Point Dile the coast begins to form a curve toward the east, in which are the Bay of Solbet and ports San Estaban and Santiago. The coast continues toward the south with a slight deviation as far as Point Darigayos almost in the same meridian as Point Dile.

Before reaching Darigayos, at the mouth of the river Amburayan, the province of South Ilocos ends and that of Union begins and extends almost in a straight line to the south, with a slight inclination toward the west, terminating at Point San Fernando. Here the eastern coast of the Gulf of Lingayen begins. Toward the eastern end of this gulf, and near the mouth of the river Rabong, the province of Pangasinan begins. The provincial boundary between Pangasinan and Zambales starts opposite the island of Cabalitian. From the vicinity of the island of Santiago or Purra the coast advances to the west and southwest, forming Cape Bolinao, and then continues toward the south without other notable variation than Point Arenas, the Bay of Agno, and Point Tambobo. At Point Caiman, somewhat to the south of the sixteenth parallel, and fronting Cuelbra Island it turns to the east to form the Bay of Dazol, on whose coast are seen points Bayamban, Banop,

[1] Encyclopedic Dictionary, Spanish and English, Vol. XI.

and Santa Cruz, in front of the islands Older and Younger Sisters. South of the shoal of Sabalay are Points Arenas and Bani, Port Masinfoc, the San Salvador and Macalabo Islands, and the points and reefs of Palaing. From here it inclines to the southeast and south-southeast as far as the mountainous peninsula which is hemmed in on the west by the Capones, Tabones, and Frailes Islands, which likewise includes on the west the Port of Subig. On the southeast of this peninsula is the Port of Silanguin.

Within the port of Subig is Alongapo, where the province of Bataan begins, forming, with the peninsula which limits it on the west, the Bay of Manila, whose coasts belong to the provinces of Bataan, Pampanga, Bulacan, Manila, and Cavite. Leaving the Bay of Manila, toward the south is found the Gulf of Patungan, with the Carabao and Limbones Islands. At the head of this bay the province of Batangas begins. Farther to the south Port Jameto, Point Fuego, Fortun Island, Point San Diego, Talin, and Cape Santiago are found. From this point, about 13° 45′ north latitude, the southern coast of Luzon presents the Gulf of Papagas, the Bay of Balayan, Point Cazador, the island of Maricaban, the Bay of Batangas, Points Malocot, Arenas, Talajib, Rosario, Malabrigo, Puno, Malagundi, and Locoloco, and the little Gulf of Coloconto. At Point Puna the coast turns toward north-northeast, and east to form the great Gulf of Tayabas. At the north of San Juan de Bogbog, at the bar of Nayon, the coast of the province of Tayabas begins. From here it stretches to the southeast and south, and Point Tuguian, the Bay of Catananan, the island of Mompog, the Port of Mulanay, the Gulf of Agoin, Aguasa Bay, and Point Bondog, this being the extreme southern point of the great peninsula which bounds the Bay of Ragay on the west, at which point to the north and east the coast of Tayabas ends and that of South Camarines begins. The eastern coast of this bay advances to the south nearly to the thirteenth parallel at Point Cadburanan, where to the north, and not far from Point Talo, is the boundary between South Camarines and Albay. After doubling this point, Cadburanan, called also Point Panganiran, the coast extends to the east and southeast and forms an irregular peninsula, whose southern end is the extreme southern point of the island, 12° 32′.

Along this coast are the islands of Lamuyon and Solitario, the promontory of Catandalan, the port of Putiao, the great port of Sorsogon, and several small bays. Doubling Points Langao and Babulgan, in the Strait of San Bernardino, the eastern coast of Luzon begins. The islands of Calinton, Iaac, and Tictin are first seen, and to the north the prominent point of Binorongan and others, as far as Bingay, where the coast turns to the west to form the Bay of Albay, shut in on the north by the islands of Rapu-Rapu, Batan, and Cacraray. This, with the island of San Miguel and the coast north of the peninsula, which bounds the northern part of this bay, forms the Bay of Tobaco. Again the coast takes a direction north and northwest, and at Punta Gorda, somewhat to the south of the island of Atalayan, is the eastern boundary of the provinces of Albay and South Camarines. The coast then turns in a semicircle to form the Bay of Lagonoy and continues to the east as far as the Straits of Maqueda and Tacbun, where the Bay of Lugon and the Canaguan Islands are seen.

At Point Panahonga, near the Pitogo Islands, the coast inclines toward the west and continues in this direction of west-northwest, with

great irregularities, as far as the Bay of Lamon. Along this distance are curved successively the islands of Matatarad, Lanquipao, Luesuhin, Lahuy, and Quinabugan, Point Tinajuagan, the port of Sisiran, the islands of Quinalasag, Bacacay, Lamit, Sibanan, and Paniqui, the Point and port of Tambang, Point Quinabucasan, the islands of Siruna, Canton, Caringo, Camino, and others, at the entrance to the great Bay of San Miguel. Along the western coast of this bay is the boundary between North and South Camarines and the island of Quinamanucan, the Calagnas Islands, Cape Baluagan, and Point Pinagdungan, Paranquiran, and Tailon, Pulumbato and Tunco islands, the Bay of Mambulao, and various small islands; also the island of Jaulo and the Bay of Sugot, at the head of which is the boundary between North Camarines and Tayabas. Much to the north are the island of Jomalig, the peninsula which terminates in Point Dappal, the Balegin, Pasig, and Alabat islands, and the Bay of Apal.

From the bay of Lamon, fronting the island of Calbalete, the coast of Luzon continues from south to north with some inclination to north northeast. It is the least known of any part of the island. Its coast line corresponds to the district or province of Infanta, and the most notable features of it are the royal port of Lampon and Point Inaguican, fronting the southern part of the island of Polillo. Passing the northern boundary of Infanta, along the coast of Nueva Ecija, the Bay of Dingala is found; to the north of which, not far from Point Sua, the province of Principe begins. Here the coast begins to incline more to the northeast, and along it are seen Point Diotoring, the Bay of Dibut, Point Encanto, the Bay of Baler, the Bay of Casiguran, and the strait and long peninsula which terminate with the cape of San Ildefonso.

Somewhat to the north of this peninsula the coast of the province of Isabela begins. Here are seen the Bay of Dilasac, or port of Tumango, and the Bay of Palanan. After describing the curve which forms this bay it goes almost due north, interrupted only by the small peninsula of Point Aubarade. Doubling quickly to the northwest and west, it forms the port of Dunalanson and the Bay of Divilican, and again takes the direction north and north northwest as far as 17° 30′ north latitude, where the province of Isabela ends and Cagayan begins. Without notable variation it passes latitude 18, turns to the northeast to form a curve, and takes a westerly direction at Point Escarpada. On the coast of North Luzon, from this point, are passed the island of Palani and Cape Engano, forming a great bay or curve towards the south, where the mouth of the river Cagayan is, and further to the northwest the mouth of the river Pamplona is seen. It continues to the northeast as far as Point Cabiumgan, and at that point to Mayraira, farther to the west, which are the most northern points of Luzon. Between these two points, somewhat nearer the former, is the boundary between Cagayan and North Ilocos. Farther on, between points Dialao and Negra. is seen the Bay of Bangui.

TOTAL AREA AND POPULATION.

The total area, including the nearest adjacent islands, is 106,631 square kilometers, and the number of inhabitants 3,432,424, according to the table which will be seen in the introduction.

TERRITORIAL DIVISION.

NORTH OF LUZON.

The north of Luzon includes the provinces of Cagayan, near to the island of Palani, and the comandancias of Apayaos, Cabagaoan, and Itaves; North Ilocos and South Ilocos, with the comandancias of Amburayan and Tiagan; Abra, with the comandancia of Bontoc; Isabela, with the comandancias of Saltan and Lavac; Lepanto, with the comandancia of Quiangan; Union, Benguet, Nueva Viscaya, with the comandancia of Cayapa; and the district of Principe, with the comandancia of Binatangan. These provinces and districts, marked out on map No. 7 of the atlas of the Philippines, constitute the subject-matter of Chapter II.

CENTER OF LUZON (A).

Includes the provinces of Zambales, Pangasinan, Nueva Ecija, Tarlac, Pampanga, Bulacan, and the district of Infanta, near to the island of Polillo. They are included in maps Nos. 8 and 12 of the atlas of the Philippines and are discussed in Chapter III.

CENTER OF LUZON (B).

Includes the provinces of Bataan, Manila, Cavite, Morong, Laguna, and Batangas, and are indicated in map No. 9 and discussed in Chapter IV.

SOUTH OF LUZON (A).

Includes the provinces of Tayabas and North Camarines, shown in map No. 10 and described in Chapter V.

SOUTH OF LUZON (B).

Includes the provinces of South Camarines, Albay, and Sorsogon, indicated in map No. 11 and described in Chapter V.

ADJACENT ISLANDS.

In the discussion of each one of the groups of provinces something is said of the nearest islands, leaving to Chapter VI the full discussion of the so-called "adjacent islands," which are, in the order of their situation from north to south, the Batanes and Babuyanes Groups, Mindoro and its adjacent islands, Burias, Masbate and Ticao, the Calamianes Group, and Cuyos Group. Of the races which inhabit these islands and their languages brief mention will be made in the discussion of the various provinces, but only by way of description, without taking up philological or other considerations, which the reader will find in Paper 7, where the ethnology of the Filipinos is treated in full. As the products of these islands are so varied, as also the industry and commerce of the various provinces, these points will be touched upon in the description of each separate province, the reader being referred to the special paper on the commerce and industries of the Philippines, Paper II.

CHAPTER II.

NORTH OF LUZON AND NEAREST ISLANDS.

[Map No. 7 of the atlas of the Philippines.]

PROVINCE OF CAGAYAN AND ISLAND OF PALANI.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

This province is very large and rich, and is one of the oldest in the archipelago. On the north it is bathed by the China Sea, bounded on the south by Isabela, on the east by the Pacific Ocean, and on the west by Itaves and Apayaos and North Ilocos. The country is broken with high mountains covered with vegetation. Between the low mountains and the elevated chains there are extensive but irregular valleys, with calcareous and clay or granite soil. There are about fifty rivers and creeks, which water these valleys. There is a notable grotto in the island of Quira.

AREA AND INHABITANTS.

The area of this province is 13,968 square kilometers. The inhabitants number 96,367. The province is inhabited by various races, the pagans usually occupying the mountains and the more inaccessible coast of the Pacific. The Aetas, or Negrito race, inhabit the eastern chain of the Sierra Madre Mountains on the Pacific side. The Irayas occupy the western side of this chain. The Gadanes occupy the country between the Chico and Magat rivers. The Calingas[1] are found between the Rio Grande and the Apayao River and Mount Abulug. The Apayaos are found in the great central chain of Luzon; the Itaves toward the south of the province. The Calanas, Nabaguyanes, Catalanganes, Itetapanes, and Dayadas are found in the mountain regions. The Gumaanes live in the highest mountains between Abra and Cagayan. The Christian natives are called Cagayanes. A certain number of immigrants from Ilocos are also found. Many of the civilized inhabitants are descendants of this race; others come from other races and provinces of the archipelago, and constitute, with the Cagayanes, the nucleus of the population of the towns. The natives are pacific and affable, and are considerate of their guests.

TOWNS.

The capital is Tuguegarao, situated near the Rio Grande, toward the south of the province, and numbers 17,358 inhabitants. The church and government houses are of stone, and the public square is one of the largest in the entire archipelago. The principal town is Aparri, with a

[1] Calinga in the Ibanag language means "enemy," and is applied at times to the savages of the valley of the Rio Grande de Cagayan. This word is usually used to indicate the pagans, who inhabit this zone.

population of 11,665, situated at the mouth of the Rio Grande, the port of which is very shallow, and only small steamers can enter the mouth of the river with safety during the months from November to January. From Aparri, going up the river, the following towns are successively encountered: Camalanigan, with a population of 5,171; Lal-lo, which formerly was the Episcopal see of Nueva Segovia, with 5,707 inhabitants; Gattaran, with 2,148 inhabitants; Nassiping, with 835; Alcala, with 6,637; Amulung, with 6,493, and Iguig, with 4,619. All of these towns are found on the eastern side of the river. On the western side, almost in the southern limit of the province, is found the town of Enrile, with a population of 6,000. To the north of Enrile is Solana, with a population of 5,000, and Tuao, on the banks of the River Chico, with a population of 4,025. Toward the north the towns of greatest importance are Pamplona, with 3,441 inhabitants, and Claveria, with about 2,000. The total number of towns is 22, there being also 180 villages or hamlets and 143 hamlets of subjugated infidels.

DIALECTS.

In the vicinity of Tuguegarao, Ibanag is commonly spoken. The people of the town itself speak Itaves, and the Negritos speak Idayan, or Aeta. On the opposite side of the river from Tuguegarao, in the vicinity of Enrile, the Gaddane language is spoken. In Alcala, as most of the families constituting the population have immigrated from Ilocos, the Ilocos language is spoken almost exclusively. In the north and on the eastern bank of the Rio Grande, Ibanag is generally spoken, and is considered to be the language of the most cultivated people, and is the same as the Cagayan, which is spoken in many parts of the province. In the hamlets on the western side of the river, Itaves, Apayao, and Mandayo are spoken, and Maneleg is spoken in the southern part.

PRODUCTS, INDUSTRY, AND COMMERCE.

The principal and most valuable product is tobacco, of which 300,000 bales, valued at more than $1,000,000, are annually exported. The best quality is produced in the vicinity of Itaves, where there still remain large uncultivated areas, whose cultivation could easily double the production of this valuable commodity. There are most excellent woods, but on account of the broken and mountainous character of the country they are difficult to obtain. The natives take a certain amount to the towns, dragging it along with carabaos as far as the rivers or creeks, from whence it is taken down in rafts or barangayanes.[1] The principal kinds are camalayad, brenga, pamalalian, and afin, which is employed in the construction of small boats, molave, ipil, narra, camagon, cedro, ebano, palo-maria, and others, which are employed in the construction of houses and furniture. In addition to tobacco, rice, corn, and nipa are cultivated. It is, however, necessary to import rice and other food stuffs, because that raised is not sufficient to maintain the inhabitants. The industries are represented

[1] See plate 1, which represents a pontoon bridge over the river Tinacanacian, on the plantation of San Antonio. We are indebted for this photograph and others in this chapter to the kindness of Don Arnando Villemer, chief of the Compania General de Tobacos de Filipinas.

by blacksmith and carpenter shops; distilleries for the distillation of wine from nipa; fisheries; salt-making establishments; rice mills; and a few ordinary looms for the weaving of fabrics, which are used in the manufacture of clothing and the manufacture of mats from buri. There are in the province about 80,000 head of live stock, of which 32,000 are carabaos, 21,000 cattle, 14,000 hogs, and 13,000 horses. Some stone quarries are worked, and it is said that there are copper mines in the volcanic chain of Magnipit.

The roads which lead from Tuguegarao to Cabagan, in Isabela; from Llao to Aparri; from Llao to Alcala and to Tuguegarao; from Tuguegarao to Carig; from Tuao to Piat, and from Piat to Tabang are always in good condition and permit of the passage of carriages. Those which unite the other towns with each other can be used only by horses. These paths and roads are impassable during the rainy season. Rivers are crossed by means of bridges of balsas or rafts.

THE ISLAND OF PALANI.

The island of Palani, separated from the northeastern extremity of Cagayan by a narrow strait, is of medium height and with very rugged coasts; it is about 5 miles long from north to south and 2½ miles wide. Cape Engaño, formed by its northeastern extremity, is of medium elevation, and its southern point, which is at the same time the point west of Point San Vicente, is an elevated and rounded mountain. The point which forms Cape Engaño has in front a short coral reef, from which are visible two rocks called the "Two Sisters." The larger and most northern of these is about one-quarter of a mile wide and about one-half mile from the cape. The coast to the west of the island is rugged and inaccessible to the point. To the northeast are two islands, the largest and most distant being called the Isla del Cabo, or Big Laja, and which is an inaccessible square of lava, approximately one-half mile long, and can be seen at a distance of 27 miles. The water in sight of this island is from 15 to 20 meters deep. There is at Cape Engaño a light-house of the first class, showing groups of white lights.

COMANDANCIA OF APAYAOS.

This politico-military comandancia, situated on the eastern side of the grand central chain of mountains of the north, is bounded on the north by Claveria, Pamplona, and Abulug; on the east by Llao and Gattaran, as far as the junction of the Rio Chico with the Cagayan River; on the south by the left bank of the Rio Chico, and on the west by the slopes of the grand mountain chain of the north. The population is about 16,000, and includes about 40 villages. The principal towns are Fotol and Capinatan.

COMANDANCIA OF CABAGAOAN.

The plitico-military comandancia is bounded on the north by the towns of Pamplona, Claveria, and Abulug; on the east by the comandancia of Apayaos; on the south by Abra, and on the west by North Ilocos.

COMANDANCIA OF ITAVES.

This politico-military comandancia, organized in 1889, is bounded on the north by the legal limits of the Apayaos tribe, and on the east by the limits of the towns of Reina Mercedes, Gamu, Ilagan, Hacienda de Santa Isabel, Fumanin, Cabagan Nueva, and Viejo, Santa Maria, Enrile, Solana, Fuao, Piat, and Manaleg in its western mountains, which join with the Apayaos tribe on the south at the legal boundary, along the watershed north of the mountains of Bunginan, on the west by the boundaries of the provinces of Albay and Bontoc. It contains more than 15,000 inhabitants. The principal town is Magogao. There are in Itaves more than 126 villages, formed for the most part by the Calanas, who speak the Itaves language.[1]

NORTH ILOCOS.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

This province is bounded on the north and west by the China Sea, on the south by South Ilocos, on the east by the central mountain chain, as far as its termination at the China Sea, which separates it from Cagayan and from Abra. Its greatest length from north to south is 19 leagues. The country is mountainous and much broken, with excellent and varied vegetation.

AREA AND INHABITANTS.

The area of this province is 3,324 square kilometers, inhabited by some 163,349 persons, according to the civil census. A certain number of the Apayaos tribe, Tinguianes, and Igorrotes also inhabit this province, but the majority of the population is composed of Indians, called Ilocanos.

TOWNS.

Laoag, which means "clearness," because the sky and atmosphere are always clear, is the capital, has a population of 28,122, and extends for about 3 miles along the seashore and along the river of the same name, on an extensive plain, having some hills. About the center is an excellent church and hospital and many houses well constructed. San Nicolas, to the south of Laoag, on the opposite bank of the river, has 9,584 inhabitants. San Miguel, farther in the interior, on the bank of the same river, has 8,993 inhabitants. Dingras, still farther in the interior, but also near to the river, has 11,547 inhabitants. Piddig, to the north of Dingras, has a population of 10,579. Bacarra, not far from the sea, on the bank of the river of the same name, has a population of 12,343. To the south of San Nicolas is the important town of Batac, containing more than 19,000 inhabitants; and to the south of Batac, on the seacoast, is the port of Currimao. Pasay, between Batac and Currimao, has a population of 12,153. Farther to the south, and on the seacoast, is the town of Badoc, with a population of 9,000. The principal town of the north is Bangin, with a

[1] Plates 2, 3, 4, and 5 will give some idea of the general aspect of the country in the extreme north of Luzon. They all come from the plantation owned by the Compania General de Tobacos, called San Antonio, situated not far from Tuguegarao.

population of 6,177. The province has a total of 15 towns, situated generally at a short distance from the sea, about 119 villages and hamlets, and 54 hamlets of subjugated pagans.

DIALECTS.

Ilocano is spoken generally throughout the province, and the Tinguianes, living in the hamlets near the principal towns, although they have their own dialects, understand and speak Ilocano.

AGRICULTURE, INDUSTRY, COMMERCE, AND WAYS OF COMMUNICATION.

Wheat and other products of the temperate zone, especially vegetables, can be cultivated in this province. In the mountains are found the best of the indigenous woods, and in the north, in the interior, the pine, the oak, and other similar woods are found. In the mountains, pitch, honey, and wax are found in abundance, also wild carabaos, boars, deer, and jungle fowl, pigeons, and many other kinds of birds. In all of the towns of the provinces rice of superior quality is grown; corn, a good quality of cotton, sugar cane, and a fair grade of tobacco are raised. In the town of Bangui a considerable amount of coffee and chocolate is grown. The men occupy themselves for the most part in agriculture, and the women in spinning and weaving, the town of Pasay being especially noted, as here are made the famous blankets of Ilocos. Horse raising is notable, as is also cattle raising. Fish are found in abundance in the rivers and along the coast. The soil lacks nothing in natural richness, abounding in iron.

The province is traversed from north to south by an excellent highway which crosses the towns of Bangui, the most northern, Nagpartian, Panguin, Bacarra, Laoag, San Nicolas, Batac, and Badoc. The road then runs into the province of South Ilocos, whose first town is Sinait. From the town of Batac a highway runs to Pasay, all situated to the west, and to the port of Currimao, the best in the province. From west to east, starting from the head town, is another highway which, after passing through the town of San Miguel, divides into two; one of these leads to Piddig and Solsona and the other to Dingras and Banna. Another highway connects the principal town with the town of Vintar, from which it passes to Bacarra, there uniting with the main road from north to south.

SOUTH ILOCOS.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

This province is bounded on the north by North Ilocos, on the south by Union, on the east by Abra and the districts of Tiagan and Lepanto, and on the west by the China Sea. It has a length of 18 leagues from north to south, and is about 5 leagues wide. The country is flat rather than mountainous, and is separated from the province of Union by the Rio Grande de Amburayan.

TOTAL AREA AND POPULATION.

It reaches in area 1,424 square kilometers, of which some 534 are under cultivation and about 700 in forests. The number of inhabitants is more than 178,000, the greater part of these being Ilocanos;

there are some hamlets of Tinguianes, especially in the mountainous region. The Ilocanos are frank and active in character, which makes them greatly appreciated in all regions.

TOWNS.

The capital or head town, Vigan, founded by the intrepid Salcedo, was formerly called Villa Fernandino, and has a population of 12,000. The city is the Episcopal see of the Bishop of Nueva Segovia. It is situated near the river Abra, on the right bank, and not far from the coast. It has fine streets and a beautiful driveway, and many buildings of excellent construction, among these being the cathedral, the Episcopal palace, the seminary, the government house, the house of the tax department, the city hall, the normal school for girls, the native town hall, the barracks, the prison, and many other structures which aid in giving it the aspect of a city.

The towns of greatest importance are Sinait, to the south of Bodoc, in North Ilocos, the most northern town, with a population of 7,209. Next, to the south, is Cabugao, with 9,000; Lapo, with 4,682; Magsingal, with 10,441; Santo Domingo, with 5,355; San Ildefonso, with 8,361; San Vicente, with 4,000; Bantay, with 8,360, and Santa Catilina, with 8,737 inhabitants. Continuing farther to the south is found the largest city of the province, Narvacan, with 16,882 inhabitants; Santa Maria, with 11,720, and Candon, the third in population, with 14,035 inhabitants. The most southern town, Tagudin, has a population of 7,864. All of these towns are situated near to the coast, and are named in their order of latitude from north to south. There is a total of 21 towns, 587 villages or hamlets, and 55 hamlets of subjugated pagans.[1]

DIALECTS.

Ilocano is generally spoken, Tinguian in some of the hamlets, and other dialects among the pagans of the mountains.

PRODUCTS, AGRICULTURE, INDUSTRY AND COMMERCE, AND WAYS OF COMMUNICATION.

Panorapin, palochina, casisguis, deran, banaba, aculao, and busilising are woods found in relative abundance. Of the 434 square kilometers under cultivation in the province, 36 are of the highest class. Of the land under cultivation, 282 square kilometers are in rice, 55 in corn, 1 in wheat, 34 in indigo, 29 in sugar cane, 2 in chocolate, 2 in the celebrated maguey fiber, 65 in vegetables, and 64 in peanuts.

In regard to industry, it is sufficient to say that looms are found in every town, these being managed by the women, who weave cotton cloth for domestic use. The towns most noted for this industry are San Ildefonso, Bantay, Cavayan, and San Vincente. In the latter town are several furniture shops. In Vigan, the head town of this province, is a carriage shop, which manufactures carriages of all classes and prices. Almost all of the towns have one day of the

(1) Other pagans found in the province are Brisaos, Igorrotes, Quinanos, and Negritos, who are found in the mountains to the east, sharing the country with the Itetapanes, Mayoyaos, Sitipanes, and others.

week set apart as a market day, and on those days vegetables and fruits of the country, cloth of silk and cotton made in the province, pottery, cloth made in China, and the various agricultural products of the province, are bought and sold. The articles of export are indigo, cocoanut, sugar, brown sugar, sweet potatoes, cotton, and the maguey fiber. The imports are large quantities of rice, inasmuch as the production of this article in the province is not equal to the consumption; preserves from Europe, dried fish, iron (manufactured and unmanufactured), oil, alcohol, and indigo seed.

The ways of communication, although they leave a great deal to be desired, are nevertheless the best in the archipelago; and as the level part of the country comprises almost all the cultivated agricultural zone, all of the towns are well provided with roads throughout the country districts, which facilitate the transportation of the products of the country. Along the line of road which traverses the country from north to south between Vigan and Sinait there are bridges of wood and brick in good condition. From Vigan toward the south, as far as the boundary of the province of Union, gullies and rivers of little depth are lacking in bridges, and those carrying considerable water have during the dry season light bridges of wood and bamboo which are carried off by the first flood, the passage of the river from that time being made on rafts made from bamboo. Salomague, to the north of the Bay of Masingat and the Bay of Lapuag, is a port of some importance.

NEAREST ISLANDS.

The nearest islands of importance are Pinget and Salomague. Pinget, situated near and to the northwest of Point Santo Domingo, is very low, covered with forests, has beaches of sand, and is surrounded with reefs which are very precipitous on the west, inasmuch as less than half a mile distant the water is more than 50 meters deep. This point and island form a small anchorage, to which there is but one entrance on the south, as the coast to the north is surrounded by reefs, which almost unite with the coast on the east of the island, and would be very difficult to avoid.

SALOMAGUE.

At approximately a distance of 1 mile to the northwest of the point north of the port of this name there is an island of moderate height surrounded by a reef which extends scarcely a cable's length[1] to the southwest and forms with the coast a passage in which there is a depth of from 28 to 30 meters in the center, surrounded on both sides by a reef which starts 2 cables' length from the coast in the middle of the island.

COMANDANCIAS DE TIAGAN.

This comandancia is situated between Abra, Amburayan, Lepanto, and South Ilocos. It has 7,793 inhabitants, divided among 25 hamlets and 53 villages. The principal town is San Emilio, with a population of 1,658.

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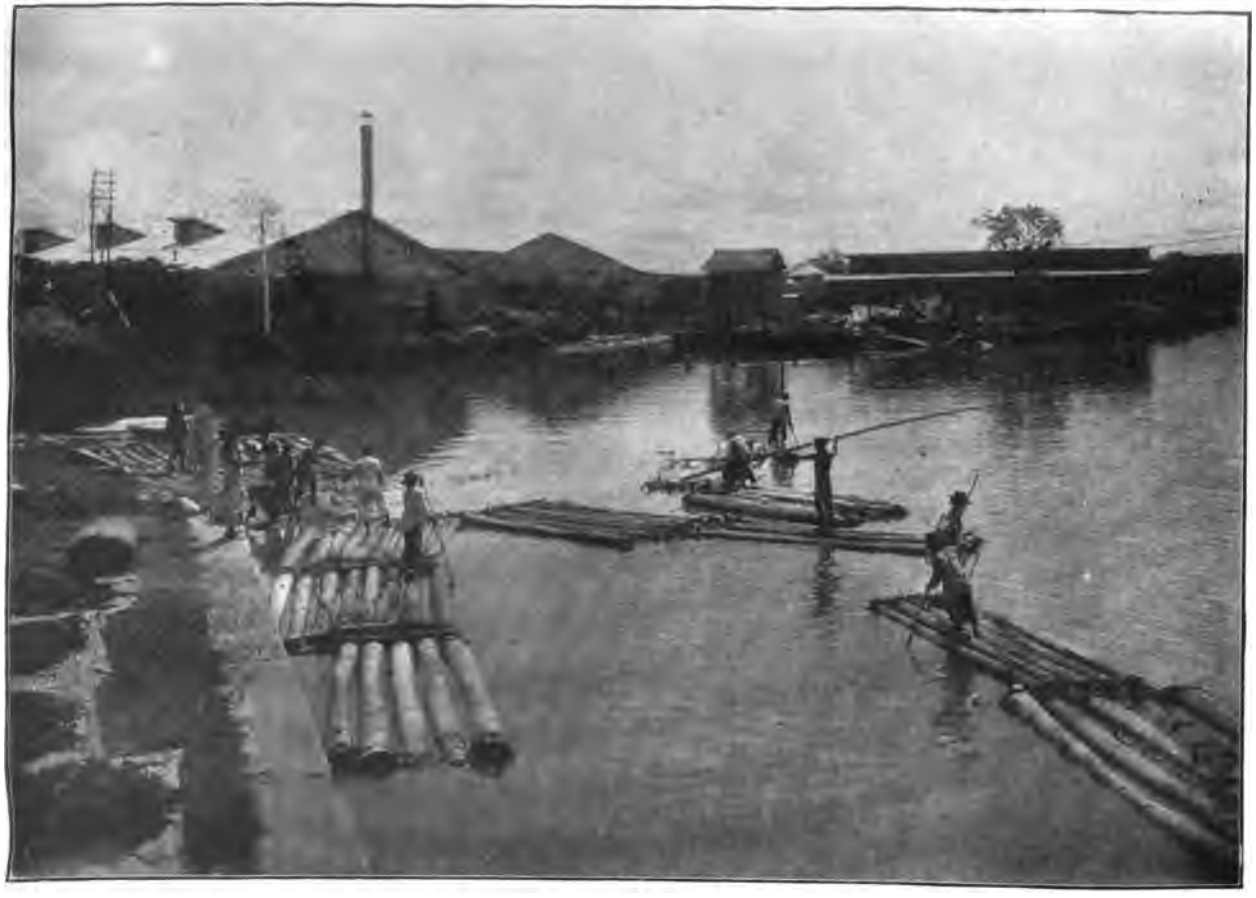
[1] A cable equals 120 fathoms.



RAFTS OF LOGS.

TH
IU

PRODUCTS.

The Igorrotes of the mountains and the tribes called Buric and Busao cultivate rice, coffee, chocolate, corn, sugar cane, sweet potatoes, cotton, and vegetables. Industry is limited to the weaving of cloth and the making of baskets, hats, cardcases, and pipes.

COMANDANCIA OF AMBURAYAN

is bounded on the north by Tiagan and South Ilocos, on the south by Union, on the east by Lepanto, and on the west by the province of South Ilocos and Union. The population is made up of 30,000 pagans, mostly Igorrotes, and 150 Christians, distributed among 34 towns and 76 hamlets. The town of most importance is Alilem, the capital. Cancanay and Tinginan are the languages spoken. The other towns are Luyo and Cabacan.

INDUSTRIES.

Limited to the making of cotton cloth and other articles used by these pagans.

PROVINCE OF ABRA.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

This province takes its name from the large river which runs through its center. It is bounded on the north by North Ilocos, on the east by Cagayan and Isabela, on the west by South Ilocos, and on the south by Bontoc and Lepanto. From north to south it is about 20 leagues in length, and from east to west about 8. The entire province is very rugged, and is crossed in every direction by small mountain chains. Its vegetation is robust and vigorous, and the mountains are covered with forests of large trees, some noted for their size, others for the firmness and hardness of their woods, and almost all of them for their exquisite fruits. The country is volcanic in general, with silicious rocks and alluvial deposits.

AREA AND POPULATION.

It has an area of 2,837 square kilometers and a population of 41,300, according to the civil census. In the mountains are found some Negritos and Guinaanes. The greater part of the province is occupied by Tinguianes. Most of the civilized inhabitants are Ilocanos. There are likewise about 2,000 Igorrotes.[1]

TOWNS.

The principal town is Bangued, on the left bank of the river Abra, toward the west of the province, which has a population of 13,500. This town is situated about four hours' drive from Vigan. Tayum, to the east of Bangued, has 11,237 inhabitants. Bucay, also on the left

[1] We judge that the modern opinion of certain ethnogrophists is correct that the word "Igorrote" is not a generic name for various races, but rather for one special race, and it is with this understanding that we use it.

bank of the river, has 4,995; Villavieja, in the southern part of the province, 2,331; La Paz, to the north of Tayum, 2,000; Pidigan, to the southwest of Bangued, on the left bank of the river, 2,295; San Gregorio, between La Paz and Tayum, 3,262. There is a total of 11 towns and 30 villages.

LANGUAGES.

The Ilocano language is generally spoken in the towns, and the Igorrote language in certain villages. The other pagans speak their respective dialects, Tinginan, Basiao, and Guinnan.

PRODUCTS, INDUSTRY, AND COMMERCE.

Agriculture is well advanced, considering the area under cultivation, some 43 square kilometers, and the limited number of laborers obtainable. The principal products are tobacco, rice, corn, of which three crops are harvested each year, sugar cane, and vegetables. On the tops of the mountain ranges are found the pine, oak, strawberry tree, and other trees of the temperate zone. The above-mentioned products, together with cotton, which is now cultivated, rattan, honey, and wax constitute the principal articles of export. It should be added that prospecting for mines of copper in the region of Gambang, between Vigan and Bangued, and for coal, of which there are indications near the village of Pagano toward the east, toward the village of La Paz, and iron pyrites, found in various situations, promises returns. Large game, such as buffalo, boars, and deer is abundant in the mountains, and the number of species of monkeys inhabiting the various islands is almost innumerable. The only industry is the weaving of cotton cloth of various kinds, many of these being notable for their firmness, evenness, and durability. The towns are united by various roads, suitable for animals, which likewise connect this province with Lepanto, Cagayan, and South Ilocos.

COMANDANCIA OF BONTOC.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

It is bounded on the north by Isabela, on the south by Lepanto, on the east by the district of Principe and Nueva Viscaya, and on the west by Abra. It measures from north to south some 50 kilometers, and from east to west 27. The country is mountainous and not very fertile, probably of volcanic nature; the climate is temperate and humid.

AREA AND INHABITANTS.

It measures 1,322 square kilometers and has 13,985 inhabitants registered in the civil census. Of the pagan inhabitants some are Ifugaos, others Igorrotes and Busaos; there are also Itetapanes, Calingas, Gaddanes, and Dayadas. Some authors, in consideration of the number of races scattered over this territory, place the total number of inhabitants at 82,500.

TOWNS.

The most important and almost the only town is the head town, having the same name as the province. It has a population of 10,751. The villages of Sagasa, Sacasacan, and Basao, recently organized, are worthy of mention.

LANGUAGES.

Ilocano, Suflim and Itetapan, Igorrote, and other analogous dialects are spoken.

PRODUCTS AND COMMERCE.

The only cultivated lands lie along the banks of the river. The only industry of the few pagans is the manufacture of salt from the springs of Mainit, to the southeast of Bontoc. . The water of these springs is clear, hot, without odor, and salty. In Dalican, to the west of Bontoc, there is an abundance of iron pyrites; and at Tanolo there is a bed of ore supposed to be argentiferous galena. There is no commerce.

PROVINCE OF ISABELA AND THE COMANDANCIAS OF SALTAN AND LLAVAC.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

It is bounded on the north by Cagayan and Itavés, on the south by Nueva Viscaya and Principe, on the east by the Pacific Ocean, and on the west by Lepanto, Bontoc, and Abra. The country is covered from north to south by the Rio Grande de Cagayan, and from southwest to northeast by its large tributary, the Magat. The eastern zone, along the coast of the Pacific, is mountainous and rugged, as through it, running from north to south, is the Sierra Madre Range. The zone which extends from the west of the Sierra Madre Mountains is very extensive, and presents plains and valleys fertilized by the Rio Grande and the Magat.

AREA AND INHABITANTS.

It measures about 14,234 square kilometers, and is the largest province in Luzon. It has 48,302 registered inhabitants. In some of the eastern mountains Negritos are found. The other pagan inhabitants are of various races. Igorrotes, Togades, who live between Echagüe and Angadanan, Gaddanes, Mayaoaos, Ilongotes or Ibilaos, Bujuanes, Silipianes, Binanganes, Bunginanes, the Isanayas, the Ilongotes, the Buayas, who inhabit the Defim country, and the Catalanganes. Among the civilized Indians there are a great many Tagalogs. This is probably the province in which there is the largest number of pagan races.[1]

TOWNS.

The principal town is Ilagan, the capital, about the center of the province, situated on an elevation and surrounded by the Rio Grande de Cagayan and Pinacananan rivers. The climate is temperate and

[1] Plate 7 shows a group of native laborers on the Santa Isabel plantation.

mild. This town has been several times destroyed by fire. It has a population of 13,049 and is a twenty-four hours' drive from Aparri. Cabagan Viejo and Cabagan Nueva are situated in the north of the province on the right bank of the Rio Grande, and have a population of 9,000. Following the right bank of the Rio Grande toward the south the following towns are found: Balasag and Tumauini, the ancient capital, with 4,500 inhabitants; Gamu, to the south of Iligan and on the left bank of the river, with 5,320; Canayan, 2,167; Angadanan, 3,900; Echagüe, 6,633, and Carig, between the Rio Grande and the Magat, with 2,651. There are 22 towns, 25 villages or hamlets, and 38 villages of conquered pagans.

LANGUAGES.

Ilocano, Ibanag, Cagayan, Gaddan, and Tagalog are spoken.

PRODUCTS, AGRICULTURE, INDUSTRY, COMMERCE, AND WAYS OF COMMUNICATION.

Rice, sugar cane, chocolate, and coffee grow almost without the care of the planter; it being about the same with all kinds of vegetables, which in flavor and size can compete with those of Spain. But all this production does not meet the necessities of the inhabitants, because the area under cultivation is small. The corn crop is the object of considerable care on the part of the natives, because when rice becomes high it constitutes the principal food supply. The principal and most important product is tobacco, which is gathered in large quantities and is considered the best in the Philippines. It is the principal article of export and constitutes the wealth of the country. A few cattle[1] are raised. The forests, for the great part unexplored, are rich in valuable woods suitable for the manufacture of furniture. There is an abundance of molave, ipil, narra, camagon, and other excellent woods for building. There are but two ways of communication with the interior, that afforded by the Rio Grande, and the cart road which runs from north to south through the center of the province.

COMANDANCIA DE SALTAN.

This comandancia takes its name from the branch of the Rio Chico de Cagayan, and extends along the bend which this river forms in the comandancia of Bontoc. The inhabitants number about 14,000, mostly pagans and subjugated Gaddanes, who speak the Ibanag and Gaddan, the Yaga, and the Iraya languages.

COMANDANCIA DE LLAVAC.

This military comandancia was located in the Province of Isabela with the object of restraining the inroads of the Igorrotes and other pagans.

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[1] See plate 8, which represents one of the stock farms of the Compania General de Tobacos, on Santa Isabel plantation.

COMANDANCIAS OF LEPANTO AND QUIANGAN.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

It is bounded on the north by Abra and Bontoc, on the south by Benguet and Nueva Viscaya, on the east by Bontoc and Quiangan, and on the west by Tiagan and Amburayan. It measures from north to south 55 kilometers and from east to west 49. The country is mountainous.

AREA AND INHABITANTS.

It has an area of 2,167 square kilometers, and is occupied by various races.[1] There are 16,152 registered inhabitants of various races, Ifugaos and the Busaos Igorrotes being the most numerous.

TOWNS.

The principal towns are Cervantes, the capital, situated in the center of the district, about twelve hours' drive from Vigan, Cayan, the old capital, to the northeast, and very near Cervantes, and Mancayan, to the southeast of the capital, famous for its copper mines. There is a total of five towns and 40 villages.

LANGUAGES.

Ilocano, Cataoan, Igorrote, Ifugao, and other dialects are spoken.

PRODUCTS, INDUSTRY, AND COMMERCE.

This district has about 70 square kilometers, cultivated by a few Indians and 8,000 Igorrotes. The products are rice, tobacco, sugar cane, and a small amount of corn and garden stuff. In the forest there is an abundance of molave, banaba, pine, oak, sabine, elm, strawberry trees, cedar, and casilang. At one time the mines of Mancayan were in operation, producing annually more than 4,000 quintals of fine copper. A road starting from Vigan crosses the district from northwest to southeast, uniting the towns of Tiagan, Lepanto, Cervantes, and Mancayan, facilitating importation and exportation.

COMANDANCIA DE QUIANGAN.

This comandancia is bounded on the north by Bontoc, on the south by Nueva Viscaya, on the east by Nueva Viscaya and Isabela, and on the west by Lepanto. It has an area of about 80 square kilometers, and a population of about 30,000, divided among a multitude of hamlets, of which at least 218 are known. The principal town is Quiangan, situated in the valley of the same name, which runs from north to south from Lepanto to Nueva Viscaya, following along the river Abulao, a branch of the river Magat. Other important towns are Magulang, Nangaoa, Lagani, Sapao, and Bonaue.

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[1] The general records of the Augustinian order for 1897 give 21,745 inhabitants, and, according to the same records, the most recent population of Saabangan is 10,085.

PROVINCE OF UNION.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

This province is bounded on the north by South Ilocos, on the south by Pangasinan, on the east by Lepanto and Benguet, and on the west by the China Sea. It is 16 leagues in length from north to south, and 5 in width from east to west. The country is flat along the coast and very mountainous a short distance from the sea.

AREA AND INHABITANTS.

It has an area of 2,008 square kilometers, and is inhabited bv 110,164 registered people, belonging for the most part to the Ilocos and Pangasinan races. There are many villages of Igorrotes in the mountains.

TOWNS.

The principal town is the capital, San Fernando, situated near the port of the same name, which has a population of 14,542. Bangar, the most northern town, has a population of 10,700. From Bangar, going southward, the following towns are found: Mamacpacan, with a population of 10,000; Bacnotan, with 8,311; San Juan, with 11,189; Baoang, with 9,079; Caba, with 3,349; Agoo, with more than 11,000; Santo Tomas and Rosario, with 8,507. There is a total of 14 towns, 240 villages and hamlets, and a multitude of little hamlets within the jurisdiction of Christian towns.

LANGUAGES.

Ilocano and Pangasinan are spoken and, in the mountains, various Igorrote dialects.

PRODUCTS, AGRICULTURE, INDUSTRY, AND COMMERCE.

The mountains produce a large quantity of sebucao. The cultivated area, 64 square kilometers, is in the care of 45,000 people. The products are tobacco, rice, corn, cotton, sugar cane, chocolate, fruits, and farinacious roots. There are about 47,800 live stock in the province; 21,200 carabaos, 8,200 cattle, and 5,500 horses. A carriage road in fair condition runs parallel to the coast, and unites all of the towns above mentioned with one another, and with south Ilocos by way of Tagudin, and with Pangasinan by way of San Fabian, from which point Manila mav be reached by carriage.

COMANDANCIA OF BENGUET.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

This is an interior comandancia in the province of Union. It is bounded on the north by Lepanto and Union, on the south by Pangasinan, on the east by Nueva Viscaya and Lepanto, and on the west by Union. The country is mountainous and hemmed in between the offshoots of the great Caraballo chain. The altitude and mountainous character of the country aid in giving it a climate somewhat like that of the temperate zone.

AREA AND INHABITANTS.

It has an area of 24 square kilometers. There are 15,734 registered inhabitants, the greater number of these living in the mountains. The number of Christian inhabitants does not exceed 1,000. The pagans are mostly Igorrotes, called Benquetanos.

TOWNS.

The principal town is the capital, called La Trinidad, with a population of 2,980. It is a new and picturesque place, situated in a beautiful and extensive plain, not far from a small lake some 5 kilometers in circumference. Other important towns are Galiano, to the west of La Trinidad, having a very fertile and productive soil; Agno and Taquian, celebrated for their excellent potatoes, equal to those of Europe, and their beans; Carao, where bags and hats are manufactured; Tavio, Sudab, and Bagnio, where mines are found.

LANGUAGES.

The Catholic inhabitants speak Ilocano, and the Igorrotes, although they speak Benguetano, understand and speak the Ilocano language.

PRODUCTS, AGRICULTURE, INDUSTRY, COMMERCE, AND WAYS OF COMMUNICATION.

There are extensive areas of pine lands, and in the forests oak, camagon, and narra. The rush, from whose pith the Chinese manufacture the wicks for cocoanut-oil lamps, known in the Philippines as "tinisn," grows in great abundance. Gigantic ferns are found here. Potatoes, beans, and other vegetables grown here are quite equal to those produced in the temperate zone. Wheat and chicpeas are produced. In the mountains are found sarsaparilla, wild mulberry, and even strawberries. The pineapples, mangoes, and bananas are of excellent quality.

PROVINCE OF NUEVA VISCAYA.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

This province is bounded on the north and east by Lepanto, Bontoc, Quiangan, Isabela, and Principe, on the south by Nueva Ecija and Pangasinan, and on the west by Pangasinan and Benguet. From north to south it is 17 leagues in length, and from east to west 8 leagues in width. The country is in general mountainous. On the south is the South Caraballo Range. The province is crossed almost from southwest to northeast by the river Magat, which fertilizes the great central valley. This flat and cultivated valley is almost all under irrigation. The eastern bank of the Magat is of sandy soil, the western being clayey and the most productive.

AREA AND INHABITANTS.

It has an area of 4,384 square kilometers, inhabited by 19,379 registered people. The pagans are very numerous, in the mountains of the north there being no less than 12,000 Igorrotes. The Tinguanes, who

inhabit the northeast, a very small part of whom have been subjugated, are estimated to number 13,000. The Ilongotes or Ibilaos number not less than 4,000; and finally the Isinayas, who inhabit the country to the west and south, are divided amongst 14 villages and number not less than 10,000.

TOWNS.

The principal town, Bayombong, on the left bank of the Magat, has a population of 3,550. Almost all the towns of greatest importance are found in the great valley of the Magat. Commencing with the most northern, they are in the following order: Diadi, somewhat distant from the right bank, has a population of 2,114; Bagabag, on the left bank, 1,600; Ibung, to the west of Bagabag, 1,097; Salano, on the left bank, to the north of Bayombong, 4,411; Bambang, to the right of the river, 3,000; Dupax, to the south of Bambang, 3,000; and finally Aritao, to the west of Dupax and on the opposite bank of the adjacent branch, the Minoli, 1,000.

LANGUAGES.

The following languages are spoken: Gaddan, Isinay, Ilongote or Ibilao, and the languages of the various races of Ifugaos, who inhabit the country between Solano and the great central chain.

PRODUCTS, AGRICULTURE, INDUSTRY, COMMERCE, AND WAYS OF COMMUNICATION.

Rice is almost the only crop harvested. The soil also produces sugar cane, chocolate, coffee, and tobacco, but of an inferior quality, and in quantity insufficient to meet the needs of the inhabitants. The woods in the forest are of excellent quality, prominent among them being narra, molave, canutan, and baticulan. These are difficult to export on account of the character of the country. Resins and gums are also found, but they are not gathered. Fine stone quarries exist. Game is abundant. There is scarcely any industry worthy of mention. There is but little commerce, on account of the difficulty of communicating with the exterior. In the interior there is a fair carriage road, which unites the towns above mentioned with one another. This road is well cared for and permits of the passage of carriages during the year, except in the rainy season, when, on account of floods and the difficulty of managing the rafts because of the strong currents in the river, Bayombong, Dupax, and Aritao can not communicate with each other. The capital, Solano, and Bagabag have open communication even during the rainy season, because the above difficulties do not exist.

COMANDANCIA DE CAYAPA.

This comandancia is situated along the slopes of the River Ambayanan, near the province of Nueva Viscaya. Its area is about 660 square kilometers. It is inhabited by various races of the pagan Ifugaos. The towns are San Miguel Arcangel, with a population of 2,249, and Santa Cruz de Ana.

DISTRICT OR COMANDANCIA OF PRINCIPE.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

It is bounded on the north by Nueva Viscaya and Isabela, on the south by Infanta, on the east by the Pacific Ocean, and on the west by Nueva Viscaya, from which it is separated by the South Caraballo Range. The country is an uninterrupted succession of lofty mountains, all inaccessible and covered with dense vegetation.

AREA AND INHABITANTS.

It has an area of 3,051 square kilometers and 4,100 registered inhabitants. The greater part of the pagans are Ilongotes, with some Negritos. The savage and traitorous Italones, descendants of the Ilongotes, live in the northern part.

TOWNS.

The head town is Baler, situated on level, muddy ground; it has 2,100 inhabitants. The Bay of Baler is large and wide. Casiguran has 1,800 inhabitants, and Carignan 200. The Bay of Casiguran is one of the most sheltered of Luzon. Dilasag is a little town near the bay of the first name. It is situated to the north, between the Sierra Madre Mountains and the boundary of Isabela. There is a total of four towns and a number of pagan hamlets.

LANGUAGES.

The civilized inhabitants speak Tagalog and Ilocano; the pagans Ilongote.

PRODUCTS, COMMERCE, AND WAYS OF COMMUNICATION.

In the vicinity of the towns rice, corn, sweet potatoes, vegetables and fruits are cultivated. But little coffee, cotton, sugar cane, tobacco, and chocolate are raised, probably because of lack of communication with the exterior. This difficulty, together with the natural indolence of the inhabitants, accounts for the existence of immense virgin forests which might become excellent land for cultivation. The forest woods are of excellent quality and in abundance. Among these are baticulin, banaba, catmon, yellow narra, tuyad, and others. Although no scientific exploration has been made in this country, there is reason to believe that gold and copper mines and deposits of crystallized quartz exist. Along the coast fish are found in prodigious abundance, and in the Bay of Casiguran during the north monsoon hundreds of tons of fish are caught. The inhabitants, especially those of Baler, are very fond of hunting, game being most abundant. There is almost no commerce, merely the exchange of food stuffs between the pagans of the mountains and the subjugated natives and Christians. The ways of communication with other provinces are very scarce. On land there are a few poor paths, which with the greatest difficulty can be traveled on horse back or in hammocks. Ships never visit the coast regularly, on account of lack of trade, and during the north and east monsoon navigation in small boats is most dangerous.

COMANDANCIA OF BINATANGAN.

It is bounded north by Isabela, on the east by the district of Principe, on the south by Nueva Ecija, and on the west by Nueva Viscaya. It is composed of villages of Ilongotes (Italones or Ibilaos) and some wandering Negritos. There are about 6,000 pagans and less than 370 Christians in the district

LANGUAGES.

Ilongote is generally spoken by the pagans and Ilocano and Tagalog by the Christians. In the town of Munquia there are 4,182 inhabitants, counting Christians and subjugated pagans.

ADJACENT ISLANDS.

To the south of Point Encanta, in the Bay of Baler, between Points Dimayabay and Dicapinisan, is situated the small island and point of Distoring and several smaller islands. Between Point Encanto and the mouth of the river, near Baler, there is found a series of little islands running almost parallel with the coast; they are called "Los Confites."

HARROWING.

THE
FOUNDATION
ASTOR, LENOX
TILDEN FOUNDATIONS

CHAPTER III.

CENTER OF LUZON (A).

[Maps Nos. 8 and 12 of the Atlas of the Philippines.]

PROVINCE OF ZAMBALES.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

This province is situated on the west coast and in the widest part of Luzon. It is bounded on the north, northwest, and west by the China Sea, on the south by the province of Bataan, and on the west by the provinces of Pangasinan, Tarlac, and Pampanga. It is 32 leagues long and 7 wide. The country is mountainous and generally covered with vegetation. The low lands are fertile and almost the only ones cultivated. The coast is not clear, on account of the many stones and rocks and the abundance of reefs and banks.

AREA AND INHABITANTS.

It has an area of 2,229 square kilometers and 87,295 registered inhabitants. The pagan inhabitants are revengeful and warlike, inhabiting the mountains. The rest of the inhabitants are almost all of the Zambal race, including those called the Igorrotes of Zambales, or the savages of Zambales.

TOWNS.

Iba, the capital town, is situated on the left bank and 2½ miles from the river, which bounds it on the western side on the level plain. It has a population of 3,060, occupied principally in the cultivation of the soil, in hunting, fishing, and the raising of animals, such as cattle, carabaos, horses, and hogs. Some of the inhabitants and some of the people along the coast are occupied in the collection of amber, which is usually found along the coast. The most important towns, beginning with those of the north, are: Bolinao, with 6,200 inhabitants (the light-house and semaphore, of the first class, are situated on the cape near this town); Alaminos, near the coast of the bay of Lingayen, has 8,202 inhabitants; Bani has 4,295; Agno, 5,294; Santa Cruz, 5,319; Masinloo, 2,847; Botalan and San Felipe, 5,000; San Narciso, 7,600; San Antonio, about 4,668. In the magnificent port of Subig, one of the best in the archipelago, are situated the towns of Subig and Olonagapo. The total number of towns is 25, not counting the numerous hamlets of pagans. Besides the port of Subig there are several ports of some importance along the coast of Zambales.

LANGUAGES.

Zambal and Ilocano are spoken in the southern part, and Zambal, Ilocano, and Tagalog in the northern part. In the region of Iba and Batolan, Zambal and Pampanga are used, and in the region between

Alaminos and Bolincaguin, Ilocano and Pangasinan. The Negritos speak Aeta, but have some understanding of the most common languages of the province, such as Zambal and Ilocano.

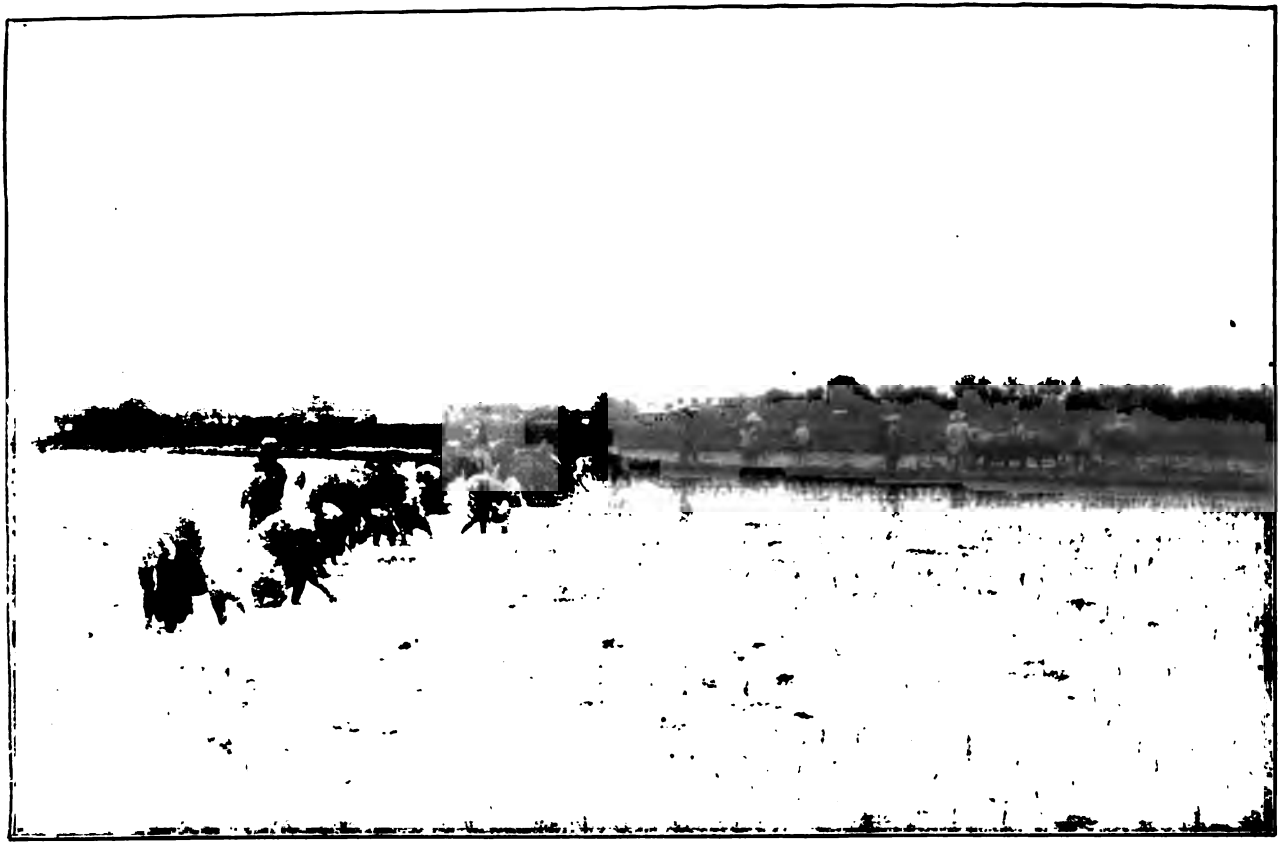
PRODUCTS, INDUSTRY, AND WAYS OF COMMUNICATION.

Besides the products common to Luzon, the province furnishes a large quantity of building material, which is abundant in the province and would form a part of its wealth if the ways of communication were better. It produces also pitch, resins, rattan, honey, wax, and amber, which is collected along the shores. Wheat is grown, and excellent rice, in large quantities. In the mountains sweet pineapple is grown, which in quality compares well with that of Java and Singapore. So many cattle are raised that with suitable means of communication they would be sufficient to furnish meat for all of Luzon. There is no lack of mineral springs, the most notable ones being those of Iba, Dosol, Polanig, and Subig. There are mines of copper and pit coal, some of importance in Agno, and between Balincaguin and San Isidro.

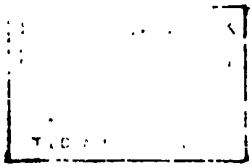
Industries are few. In some towns there are wood-working industries, and in others iron mills. Ways of communication in this province are very poor, and those that exist are almost impassable during the rainy season. There is a road from Bolinao parallel to the coast as far as Moron, in the province of Bataan, passing through all of the towns which are situated near the sea as far as San Narciso, from which point it crosses the province from northwest to southeast to Moron. This road branches at Botolan to O'Donnell, in Tarlac, and from Agno to Alaminos and Sual and San Isidro, in Pangasinan, passing through Balincaguin.

ADJACENT ISLANDS.

Within the port of Subig, near to the entrance of the bay, is Isla Grande or Pulo Malaqui. It is of medium height, covered with trees, and surrounded by reefs and shoals. To the south of this island is a smaller one, to which it is united by a sand spit and reef. Entirely within the Bay of Subig are the Mayanga and Monti islands. On leaving the Bay of Subig, toward the north are found the islands called Frailes, which are six rocks close together, and among them the Tabones, Lajos, and Capones Islands, where a light-house is situated, almost directly west of San Antonio. From the Capones, as far as the Bay of Masinloc, there is no island found worthy of mention. Within the Bay of Masinloc is the Salvador Island, of medium height, covered with trees, and distinguishable at some distance from the port; also Luan Island, near Salvador Malacaba, an island of circular form; Mataloi Island, of medium height, covered with trees and surrounded by mangroves, and the Island of Pulapir, surrounded with reefs. From the Bay of Masinloc toward the north are found, first, Putipot; then Hermana Menor, or Macaliza, an island of about a mile in diameter, low, and covered with trees. Then Hermana Mayor, some 3 miles to the north-northwest of the Lesser Culebra Island, and the little island Raton are found, respectively, to the north, one-fourth northwest, and to the east of Hermana Mayor in the Bay of Donsol. Northeast of Cape Bolinao is the little island of Silaqui. South-southeast of this is Santiago, an island surrounded by reefs and rocks; it is of about medium height. Its inhabitants are almost all united in



PLANTING RICE.



the town of Binabalian, which looks toward the port of Bolinao. To the south of Santiago is found the well-populated island of Cabarruyan. Anda, its chief town, has a population of 3,200. The island is quite high and covered with forests. Between Santiago and Cabarruyan are several small islands of little importance, all surrounded by banks and reefs of coral. Near to the southeastern extremity of the large island of Cabarruyan is a group of small, round, high islands, covered with vegetation, called Cien Islas, Mongosmongos, and Capulupuluam. To the west of this group is Comas Island, and to the south of this Cabalitian.

PROVINCE OF PANGASINAN.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

This province is bounded on the north by the Gulf of Langayen and the provinces of Union and Benguet, on the northeast by Nueva Viscaya, on the southeast by Tarlac and Nueva Ecija, and on the west by Zambales. The country is mountainous on the west, northeast, and east, flat toward the central and southern part, in the vicinity of the River Agno. The country generally slopes from the mountains to the sea in easy undulations, and near the coast is very low, thus giving rise to frequent floods, because, on account of the flatness of the country, the rivers during abundant rains are unable to empty themselves. The soil is fertile and favorable for the growth of all products.

AREA AND INHABITANTS.

It has an area of 2,854 square kilometers, inhabited by 302,178 people, the greater part of whom belong to the Pangasinan race. Some wandering Negritos live in the mountains which separate this province from Zambales. There are also some Ilocanos in the province, and along the boundary to the northeast and east a few Igorrotes.

TOWNS.

The capital is Langayem, with a population of 14,120. It has a fine church and a large number of well-constructed buildings. Sual, a seaport on the western coast of the bay of Langayen, has a population of 3,000; San Fabian, on the western coast of the bay, 10,200; Mangaldan, to the south of San Fabian, about 15,600; Dagupan, a seaport, 16,691; Binmaley, likewise a port, 16,100; Calasiao, to the southeast of Dagupan, 13,800; San Carlos, 23,934; Malasiqui, 10,770; Urdaneta, 16,600; Mangatarem, 11,000; Urbiztondo and Bayambang, to the south of Malasiqui, 5,278 and 14,444, respectively. There are other towns of more than 6,000 inhabitants too numerous to mention. The total number of towns is 29 and of villages 364.

LANGUAGES.

Pangasinan is generally spoken. In some towns in the north, northeast, and southeast Ilocano is spoken. The Negritos speak Aeta, but understand Pangasinan, as do the Igorrotes who trade with the inhabitants.

PRODUCTS, INDUSTRY, COMMERCE, AND WAYS OF COMMUNICATION.

Rice is most extensively cultivated and is harvested in abundance, notwithstanding the fact that in certain years there is a total loss of the crop in some low-lying towns on account of floods. Sugar cane, corn, tobacco, and cocoanuts are cultivated. The production of indigo, coffee, and chocolate is insignificant, although the natural conditions for the production of the first of these are superior. But few provinces have more extensive areas covered with the nipa palm than has Pangasinan, and probably not one has them in such a pitiable condition of neglect, notwithstanding the importance of this product to the native and the acknowledged danger to health which its neglect involves. This abundance of the nipa gives origin to the trade of distillation for obtaining alcohol. The industry is but small and at the present time is much neglected. Another industry which is carried on on a small scale is that of the weaving of buri, from which sleeping mats, hats, sacks, etc., are made. The delicacy of the work required in the manufacture of these articles and the firmness of texture are truly admirable. The industries which are without doubt of greatest importance are the production of rice, wines, and sugar. Commerce, wholesale and retail, is carried on by the Chinese, as in the rest of the archipelago, and this industry necessitates the employment of a large number of small boats engaged in transportation. The province of Pangasinan is rich in gum. In its forests are an abundance of woods, some of very fine quality and useful for the construction of ships, as is shown in the small boats constructed there, which, according to the best opinion, are most seaworthy. This province is not less favored by nature in the matter of minerals. Common salt is so abundant that it has given its name to the province, as "Pangasinan" signifies the place where salt is made. Gold and copper are obtained by the Igorrotes, who market these products in the towns.

The railroad from Manila to Dagupan traverses this province, passing through the important towns of Bayambang, Malasiqui, San Carlos, Calasiao, and Dagupan. Roads traverse the province in all directions and unite the towns with each other and with Nueva Ecija by way of San Quintin, with Union by way of San Fabian and Santo Tomas, with Tarlac by way of Paniqui and Bayatin, and finally with Zambales by way of Sual and Alos.

PROVINCE OF NUEVA ECIJA.

BOUNDARIES AND GENERAL CONDITIONS OF THE PROVINCE.

The province of Nueva Ecija is bounded on the north by the province of Nueva Viscaya and the district or comandancia of Principe, on the south by the provinces of Bulacan and Morong, on the east by the Pacific and the district of Infanta, and on the west by the provinces of Pampanga, Tarlac, and Pangasinan. The country is somewhat broken, and all is fertile, making it suitable to the cultivation of all kinds of products on account of the great variety of mountains and plains.

AREA AND INHABITANTS.

It has an area of 6,610 square kilometers, inhabited by 156,610 registered people. Both the civilized and pagan inhabitants are of various races. Among the former the greater part are Tagalog,

HARVESTING RICE.

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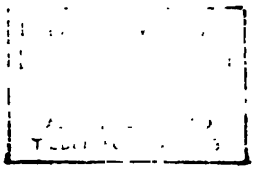


especially in the southern part; toward the north and northeast there are a great many Pangasinanes and Ilocanos; in the west, a large number of Pampangos. The pagans, not registered, inhabit the central part of the heights of the Caraballo Mountains, and are Igorrotes, Balugas or Negritos, Ibilaos or Ilongotes.

TOWNS.

The head town is San Isidro, situated on the right bank of the Rio Grande de Pampanga, and has a population of 6,900; it has a good church and some well-built houses. Commencing on the north, the towns of most importance are as follows: San Quintin, near the Pangasinan boundary, with a population of 6,892; Carranglan, near the source of the Rio Grande de Pampanga, 1,000; Viningan, to the south of San Quintin, 8,502; Rosales, to the west of Viningan, 5,016; Pantabangan, to the southeast of Carranglan, 1,200; Cuyapo, to the south of Rosales, 16,325; Bongabon, on the left bank of the Rio Grande, 5,707; Talavera, to the west of Bongabon, 7,400; Cabanatuan, to the south of Talavera, near the left bank of the Rio Grande, 11,500; Aliaga, to the west of Cabanatuan, 23,890; Taen, a short distance from San Isidro, toward the northeast, 5,524; Gapan, east of San Isidro, 20,000 (the largest town of the province, famous for the excellent quality of the tobacco which is grown in the vicinity); San Antonio, west of San Isidro, 7,000; Peñaranda, northeast of Gapan, 5,600; Cabiao, toward the south, on the left bank of the Rio Grande, 8,000. There is a total of 25 towns and 118 villages. Many of the pagans who dwell in the mountains are absolutely independent, without any sort of civil control.

LANGUAGES.

In the south Tagalog is spoken; in the north and northwest Pangasinan and Ilocano; in the west Pampango and Pangasinan, although Ilocano and Tagalog are somewhat known. The pagans speak their respective languages, and only those who trade with the Christian natives understand Tagalog, or Ilocano, or Pangasinan.

PRODUCTS, INDUSTRY, COMMERCE, AND WAYS OF COMMUNICATION.

The waters diverted from the mountains form a multitude of creeks, which by themselves, and united in large rivers, such as the Coronel Grande, Chico, Managsac, etc., flood during their frequent overflows and fertilize the fields with the mud brought down by their currents. The soil is fertile and well suited to the cultivation of the best and richest products of the country. In the central part and to the south rice is raised in abundance, more than 500,000 cavanes being exported annually. This constitutes the principal product; also large quantities of corn are raised. Along the river banks tobacco is cultivated, although in less quantity than formerly, on account of the depreciation in price which the renowned tobacco of Gapan has suffered since the monopoly, although it has the highest price among the natives. Sugar cane is easily produced, and some plantations, where its cultivation is of genuine importance, are provided with steam machinery for manufacturing and refining, and with stills for the extraction of alcohol.

In the north there are some magnificent lands under irrigation, where rice is cultivated; others are suitable for chocolate and coffee, the fine quality of the latter being shown by that which is gathered in the village of Mariquit; and, finally, in the central part of the province, there are magnificent grazing lands, where the greater part of the cattle, which constitute the peculiar wealth of the province, are pastured. Along the Pacific coast hemp grows spontaneously in abundance and is of superior quality. The forests in the level part of the country are almost all cut off, but in the mountainous regions are rich in the number and variety of their woods, those useful in cabinetmaking being as abundant as those ordinarily used in the construction of the modest dwellings of the natives. During the dry season almost the entire province can be traveled over in carriages. There is communication with the province of Bulacan by means of the road to San Isidro, and Gapan to Balnarte, in Bulacan, and Peñaranda and Mayonloc, in Bulacan; with Nueva Viscaya by way of Carranglan to Aritao, in Nueva Viscaya; with Pangasinan from Rosales to Villasis, and from San Quintin to Tayug; with Tarlac from Cuyapo to Paniqui, from Aliaga to LaPaz, and from San Juan to Victoria.

PROVINCE OF TARLAC.

Boundaries and General Conditions of the Country. Area and Inhabitants, Towns, Languages, Products, Industry, Commerce and Ways of Communication.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

This province is bounded on the north by Pangasinan, on the south by Pampanga, on the east by Nueva Ecija, and on the west by Zambales. The country is level near the sea and mountainous on the west, and in part volcanic, where it is calcareous, argillaceous, sandy, and capped with loam; and on the west of the mountain chain of Zambales calcareous and fossiliferous, having considerable elevation above the level of the sea.

AREA AND INHABITANTS.

The province has an area of 2,277 square kilometers, and a registered population of 89,339. The inhabitants, for the greater part, belong to the same races as those in Pangasinam and Pampanga.

TOWNS.

The capital is Tarlac, situated not far from the source of the river of this name, a branch of the Agno. It has a population of 12,700. The towns of most importance are: Paniqui, on the right bank of the river Agno, with 11,200 inhabitants; Gerona, to the north of Tarlac, with 9,600; Victoria, to the northeast of Tarlac, near Lake Canaren, with 12,645; LaPaz, near the Rio Chico de la Pampanga, to the southeast of Tarlac, with 1,721; Concepcion, to the south of Tarlac, with 18,671, and Capas, near to Concepcion, with about 3,865 inhabitants. San Miguel de Camiligg, Santa Ignacia, and Mariones are towns situated between the Tarlac River and the mountain chain of Zambales, and are well populated, especially San Miguel, which, according to some authors, has a population of 18,000. The total number of towns is 17, and of villages, 59.

HAULING SHEAVES OF RICE.

LANGUAGES.

Pampanga is spoken in the south and Pangasinan in the north. In the vicinity of Gerona, Ilocano is spoken a great deal.

PRODUCTS, INDUSTRY, COMMERCE, AND WAYS OF COMMUNICATION.

This province contains forest wealth of a great deal of importance, and very easy to utilize, on account of the proximity of the rivers to the forests containing useful trees. La Paz and Concepcion contain more than 150 square kilometers of very valuable woods, such as narra, acle, ambiongo, juyo, ipil, and others. Near the mountain towns of Camiling and Morriones, near the mountain chain of Zambales, there is an abundance of molave and other building woods. Agricultural products form the principal richness of this province, the most important being rice. Next in importance comes sugar, above all in the vicinity of Concepcion. The main road of the north traverses the province from north to south, branching toward the principal towns. The railroad traverses the country also, almost parallel to the road, passing through the towns of Bamban, Capas, Tarlac, Gerona, Paniqui, and Moncada. The province is connected with Nueva Ecija by the road from Concepcion to Arayan, that from Tarlac to San Vicinte, that from Victoria to San Juan de Guimba, and that from Paniqui to Cayapo. It is connected with Pangasinan by the road from Painiqui to Bayambong, by both the road and the railroad; by the latter from Camiling to Mangatorem and Bayambong; and with Pampanga by the railroad and the wagon road from Capas and Concepcion to Masapinit.

PROVINCE OF PAMPANGA.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

This province is bounded on the north by Tarlac and Nueva Ecija, on the south by the bay of Manila and the province of Bataan, on the east by the province of Bulacan, and on the west by Zambales. The country is mountainous in the western part and near the boundary of Zambales, where, besides the dividing range, is that of Mabanga, just east of Porac. There are other mountain groups to the east of Magalang, near the boundary of Tarlac. The central part of the province is flat. To the south is a multitude of canals and estuaries, which may be seen in detail in map No. 25 of the Atlas of the Philippines.

AREA AND INHABITANTS.

Pampanga has an area of about 2,208 square kilometers, inhabited by 223,902 registered people. The great majority of these are Pampangos, a peculiar and distinguished race among all of those in the archipelago. There are a few Ilocanos; in the mountains there are some Negritos or Aetas, called Balugas in the language of Pampanga.

TOWNS.

The capital is Bacolor, situated on a plane on the right bank of the River Betis, and has a population of 17,100. It has some well-constructed houses, such as the church, the convent, the gov-

ernment house, and the magnificent court-house. It has a simple monument erected to the memory of Anda y Salazar. There are other towns which compare favorably with the capital in population and in the number and beauty of its buildings, such as San Fernando, Lubao, Arayat, Macabebe, San Luis, Mexico, and Candaba, which each have more than 14,000 inhabitants; Apalit, Mabalacat, which exceed 1,000 each; Angeles, Guagua, Magalang, which exceed 9,000 each; Porac, San Simon, and Santa Ana, which exceed 7,000, and, finally, Betis, Santa Rita, Santo Tomas, and Minalin, which each have more than 5,000 inhabitants. There is a total of 25 towns, 328 villages, and 297 hamlets.

LANGUAGES.

Pampango, their own language, is used exclusively in the province. The few natives of other races in the province, and also the Balugas, who come down to the towns to trade, understand and speak Pampango.

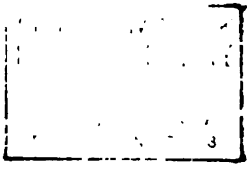
PRODUCTS, INDUSTRY, COMMERCE, AND WAYS OF COMMUNICATION.

The principal products of the province are sugar, rice, corn, some indigo, sweet potatoes, gabe, tobacco, and cotton. The value of these products is estimated at $1,210,000, more or less. Woods are scarce; nevertheless the towns of Floridablanca, Porac, Magalang, and Arayat produce some, and their value, with bamboo and palms, reaches $182,-380. There are no mines. Statistics in regard to industries were as follows a few years ago: Steam machinery for evaporating sugar, 1; alcohol stills, 8; sugar mills, hydraulic, 31; steam, 177; hand-power, 445; stone mills, 365; pottery factories, 9; looms, 12,577; belt factories, 1; carriage shops, 15; shoe shops, 6; carpenter shops, 8. In Bacolor, San Fernando, Guagua, Angeles, Apalit, and Arayat wholesale and retail groceries exist, and in San Fernando and Guagua, drug stores. In all the towns of the province carriages may be hired. Commerce is carried on in manufactured nipa, firewood (called bacuan), sugar, honey, indigo, woods, sacks, sleeping mats, lime, tobacco, and rice. Grazing is an industry very much neglected in this province, not because of lack of land, but on account of the lack of pasturage. Fisheries[1] are of value, and if in this province this branch has not reached the point of importance that it has in other provinces, it is growing, and has a value already of $13,950. And finally it should be added that there exist two telegraph stations—one in San Fernando and one in Bacolor, the first with limited service and the second with complete service, the chief of the line residing in the latter place. To the port of Guagua a steamer runs every day.

The province is divided into two parts—the high and the low—in the first of which the air is very pure and the water excellent, the temperature being cool and healthful. In the lowlands, where rice is by preference grown, there is much humidity, greater heat, and it is less healthful. This is especially true of towns located in sandy regions, these including the principal towns of the province. All of the towns have interior communication by wagon road and paths, and water communication between the towns of Bacolor, Betis, Guagua, Sexinoan, Lubao, San Miguel, Macabebe, Minalin, Santo Tomas, Apalit, San Simeon,

[1] Plate 9 represents the methods used by the natives in fishing in the rivers.

STACKING SHEAVES OF RICE.



San Luis, Arrayat, Candaba, and San Fernando, and also with the provinces of Manila, Cavite, Bulacan, Tarlac, Nueva Ecija, and Batuan; and by the aforesaid wagon roads with the same provinces, with the exception of Cavite. The railroad cuts the province from southeast to northwest, and has been the cause of a notable development of its industry and commerce. The line passes through important towns, such as Apalit, Santo Tomas, San Fernando, Calulut, Angeles, and Mabalacat, near the boundary of Tarlac.

PROVINCE OF BULACAN.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

This province is bounded on the north by Nueva Ecija, on the south by Manila and the Bay of Manila, on the east by the districts of Morong and Infanta, and on the west by Pampanga. The country is in great part flat, covered with a rich vegetation, which forms extensive forests of fruit trees. These form an arch over many roads. Some call this province "the garden of the Philippines." This province was formerly called Neicanayan, because the town of that name was the capital. The cave of Biac-na-bato, of which a good idea is given in plate 12, is very famous.

AREA AND INHABITANTS.

The province has an area of 2,965 square kilometers. There are 239,221 registered inhabitants, almost all of them being of the Tagalog race.

TOWNS.

The capital, Bulacan, has a population of 14,000. It contains well-constructed houses and a beautiful church. There is a monument dedicated to the memory of the celebrated botanist, P. Blanco, of the order of Saint Augustine. Its streets and driveways are both beautiful and wide. One of the most beautiful towns is Baliuag, which has a population of about 20,000. It is traversed by the river Quingua, has wide streets and in the square has a celebrated market weekly. At this place hats and patacas of the finest quality are made. Quingua, to the north of Bulacan, with a population of 6,714, is a celebrated health resort, noted for the baths in the crystal waters of the river. Angat, to the northeast of Bulacan, has a population of 6,630. In the mountains are found abundant iron mines and beautiful building woods—ebony, palotinto, sivucao, etc. The iron pots and kettles so much used in the country are manufactured here. San Miguel de Mayumo, with 16,865 inhabitants, is noted for its iron mines and the famous springs of Sibul, where so many are cured of their infirmities. Malolos, in the northwest of Bulacan, has a population of 13,426. Hagonoy, on the seacoast near the boundary Pampanga, has a population of 20,900. Calumpit has a population of 15,900. Maria, San Rafael, and San Isidro are towns of more than 10,000. Meycauayan, Polo, Obando, and Santa Isabel have more than 9,000 inhabitants. There is a total of 25 towns, 360 villages, and 365 hamlets.

LANGUAGE.

Tagalog is generally spoken.

PRODUCTS, INDUSTRIES, COMMERCE, AND WAYS OF COMMUNICATION.

This province is under perfect cultivation and produces abundant crops of rice and corn, large quantities of sugar, indigo, beneseed, chocolate, coffee, and all kinds of fruits and vegetables. There are excellent woods in the mountains, among these sibucao. Besides these there are gum, ginger, tingantaangan, from which oil for lamps is extracted; the castor bean, for the manufacture of oil for medicinal purposes; balao, from which varnish is made, and large numbers of nipa palms, for the manufacture of alcohol. Hat making is the principal industry, there being an extensive hat market in Baliuag. The finest quality of petacas de nito, which have been given premiums in international expositions and which are celebrated in all the principal cities of Europe, are manufactured here. Cotton cloth, sinamay, and other fabrics are also manufactured.

MINES.

In the town of Angat there is an abundance of iron ore quite undeveloped. Magnetic ore, coal, copper, lead, and silver are found, and in the beds of the rivers some gold. There are good quarries where slate and flint are found. The province is but 5 leagues from Manila. There is a daily steamer direct to Manila and a well-preserved road going by land. From Bulacan to Baliuag it is 36 kilometers, to Hagonoi 18, to San Miguel de Mayumo 17, to San Jose 28, to Meycauayan about 20. The province communicates by railroad and wagon road with Pampanga, by wagon road from San Miguel to Polo in Nueva Ecija, and also to Peñaranda, also in Nueva Ecija. Both the railroad and wagon road connect it with Manila. The railroad runs through the western part of the province, passing through the towns of Polo, Meycauayan, Marillao, Bocaue, Bigaa, Guiguinto, Malolos, and Calumpit.

THE COMANDANCIA OF INFANTA.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

This comandancia is bounded on the north by Nueva Ecija and the district of Principe, on the south by Tayabas, on the east by the Pacific, and on the west by the provinces of Morong, Laguna, and Manila. It is a strip of country very narrow, especially toward the south, in the region between the sea and the mountain chain of Banatangan, which separates it from Buacan and Morong. This mountain range throws off spurs toward the sea, and between these are small rivers. Along the coast east of Binangonan there is a peninsula, the coasts of which are almost unknown. A canal separates this from the mainland, thus converting it into an island, which terminates in Point Inaguican. To the south there is another peninsula, which terminates in Point Tactigan, to the west of which is the famous royal port, Lampon.

AREA AND INHABITANTS.

The total area, including Polillo and the adjacent islands, is 2,194 square kilometers. There are 7,100 registered inhabitants, the greater part being Tagalog. In the mountains there are some hamlets of Negritos, who, refusing to be subdued, wander about in the mountains of Binangonan.

CAVE OF BIACNABATÓ (BULACAN).
(Where insurrection of 1897, against Spain, was ended.)

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TOWNS.

The principal and almost the only town, Binangonan de Lampon, is situated about 3 kilometers from the sea. It has an excellent port, called the royal port, and is the ancient Lampon so well known in the seventeenth century, because it was then the depository of the galleons and the wealth of Manila, as it was considered a safer way of communication with new Spain than by way of the narrow strait of San Bernardino. There are two other ports, Santa Monica and Misna, completely neglected at the present time, the same being true of the royal port. Binangonan has a population of 9,095.

LANGUAGES.

Tagalog is spoken, and is understood and spoken also by the few Negritos who wander about in the mountains and come down to the plains to trade.

PRODUCTS, INDUSTRIES, AND WAYS OF COMMUNICATION.

There are fine woods in the mountains, but they are not worked, on account of the difficulty in transporting them. The area of land under cultivation is less than 1 square kilometer, this being devoted to rice. Other products are the cocoanut, chocolate, and coffee. The only industry is the manufacture of nipa wine at Binangonan. There were formerly other establishments of this kind and factories for the manufacture of cocoanut oil, but these industries were paralyzed by the injuries wrought by the hurricane of 1882. The precipitous character of the country, and the mountains and rivers which must be crossed, render the construction of good roads impossible, except at a cost not warranted by the commerce of this region. The footpath which leads to the town of Sinaloan, in the Laguna province, is the only one which exists for the use of mail carriers and travelers.

POLILLO AND THE ADJACENT ISLANDS.

SITUATION AND CHARACTER OF THE COUNTRY.

The island, which is situated in front of the comandancia of Infanta is formed of a central mountain of medium height and is covered with forests. It has the shape of a right-angle triangle whose sides north and east, broken by bays and openings, are on the north unbroken and inaccessible. The east coast is fringed with islands and dangerous reefs. On the west coast the water is deep, except in front of the port of Polillo, where there is an extensive reef, which, extending from southeast to southwest parallel with the island, forms a narrow canal, open on the northwest with a depth from 25 to 28 meters, which leads to the port of Polillo.

TOWN AND INHABITANTS.

The town of Polillo is a fair port, but little used and dangerous on account of the reefs. It has a population of 1,700, almost all of the Tagalog race.

COMMERCE.

The commerce of the island of Polillo is confined to the sale of balate and wax, which are collected in considerable quantities. Coal and other minerals are found in this island, but on account of the cost of extraction they are not worked.

THE NEAR-BY AND ADJACENT ISLANDS.

The rocky island of Tumalic, to the southeast of Polillo, is of no importance and is uninhabited. To the south of Polillo is Baleguin, a little island of no importance. To the east of Polillo there is a group of uninhabited islands. The principal of these are Palasan, Malaguinan, Cadungeoen, Iguicon, and Patnanonagan, the largest of the group.

CHAPTER IV.

THE CENTER OF LUZON (B).

[Map No. 9 of the Atlas of the Philippines.]

PROVINCE OF BATAAN.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

This province is a peninsula, united on the north with Zambales and Pampanga. It is bounded on the west by the Bay of Manila, on the southeast by the Boca-chica of this bay, and on the west and southwest by the China Sea. The country is mountainous, but in the southern extremity, where the Mariveles Range rises, there are extensive plains. The rivers are of small size and navigable only for small boats. The province is 10 leagues in length from north to south and 8 in width from east to west. Only one-sixth of the area of the province is under cultivation.

AREA AND INHABITANTS.

The area is 1,264 square kilometers. There are 50,761 registered inhabitants, the most of them Tagalogs. In the towns to the northeast there are many Pampangos. In the mountains there are many Negritos, the most of them leading an erratic life. Very few of these live in villages, and fewer still are registered in the civil records.

TOWNS.

The capital is Balanga, a beautiful place with an excellent church. The public square is beautiful and the streets straight and wide. The principal buildings are the government house, the city hall, and the prison. The population is 9,000. Other important towns are Moron, to the extreme west, with a population of 3,000; Dinalupijan, to the north, 2,600; Hermosa, to the south of Dinalupijan, 3,000; Oreni, to the south of Hermosa, 6,500; Samal, to the south of Oreni, 4,500; Albucay, to the north of Balanga, 7,000; Orion, to the south-southeast of Balanga, 7,600; Mariveles, on the port of the same name near the entrance of the bay, 2,000. There are 12 towns and 8 Negrito villages.

LANGUAGES.

Most of the civilized natives speak Tagalog, although some speak Pampango. The Negritos, who come down to trade, understand and speak either one or the other of these languages.

PRODUCTS, INDUSTRIES, AND WAYS OF COMMUNICATION.

The products are rice in abundance, sugar cane, indigo, beneseed, and different kinds of fruits. There are but few industries. In the town of Oreni there is a pottery shop, where jars for sugar and alcohol are made. In Abucay, a brickyard; in Balanga, two alcohol distilleries, and another in Pilar. On the road from Oreni to Hermosa there is a place called Lamina, where bolos (knives) are made. In the mountains there are quarries of valuable marble and white and red jasper marked with wavy lines. As the forests constitute one of the principal sources of wealth, Manila, Bulacan, and other adjacent provinces look to this province for woods for the construction of large and small boats and for building. The towns of the province are united by wagon roads. The principal one of these runs along the coast of the bay from Dinalupijan to Mariveles, bifurcating at Balanga in the direction of Moron and Bagac, on the coast of the China Sea. Communication with Manila is by water; with Zambales by land; from Moron and Dinalupijan to Santa Rita, and with Pampanga by way of Floridablanca.

THE ADJACENT ISLANDS.

At the mouth of the Orani River is the island of Tuba-tuba. This island is covered with trees and is often overflowed by the tide. There are other small islands in the same vicinity. The islands at the entrance of the bay will be described when the island of Correjidor is discussed.

PROVINCE OF MANILA.

As this is the most important province of the archipelago, it will be discussed at length. This province, which was formerly called Pondo, is in central Luzon, and is bounded on the north by Bulacan, on the south by Cavite, on the east by the province and lake of Laguna, and on the west by the bay of Manila. Although one of the smallest of the provinces, having a circumference of not more than 98 kilometers, it is, nevertheless, one of the most populous, having 500,000[1] inhabitants, divided among 28 parishes.

CAPITAL.[2]

The city of Manila, founded in 1571, is the capital of the province and of the archipelago. Here are located the residence of the governor-general, that of the archbishop, the metropolitan of all the islands, the supreme court of Manila, the departments of civil administration and of the treasury, the civil governor and municipal government of Manila, the military department, the department of military and civil engineers, the council of administration, the reasury, the post-office and telegraph departments, the customs-house, where the treasury has its offices, and the town corporation. The population is 14,000. The city has been fortified since 1590, its houses all being of solid construction. The streets are quite wide and built on the plan in accordance with the idea of its immortal founder,

[1] Consult the introduction in regard to the census.

[2] In plates 11 and 12 we give a view of Manila taken from the bay, and of the walled city taken the day after the terrible fire of September 27, 1897.

Legaspi, with such art that one side of the street is always in the shade. The public squares and the neighborhood are adorned with beautiful gardens, constantly watered by fountains, and thanks to the immortal Carriedo, who died in 1743, there is hardly a street in the entire municipal district which does not have its own standpipe to furnish an abundance of water to the people living in the vicinity. Communication between the most distant points within the municipal radius and the city is facilitated by the telephone system, having 436,549 metres of wire, and the street railway system, which runs through the principal streets of the city and its suburbs, covering a distance of about 17,200 meters.

CHURCHES.

The cathedral has been restored, following the Romano-Byzantine style of architecture. There are also in Manila four convents, with spacious churches, belonging to the religious orders of San Augustin, San Francisco, Santo Domingo, and the Recoletos of San Augustin. Also the residence and church of San Ignatio, belonging to the Jesuits, the mission church of the Capuchins, the convent and church belonging to the religious order of Santa Clara, and the Church of the Third Order.

PUBLIC INSTRUCTIONS.

There is a seminary in charge of the Paulist friars. A university in charge of the Dominicans confers the degrees of licentiate and doctor in theology, and of licentiate in civil law, medicine, and pharmacy. The college of San Juan de Letran, in charge of the Dominicans, is an institution of primary and secondary instruction. Another subsidized by the civil government, called the Ateneo Municipal, is in charge of the Jesuits. In both of these studies applicable to commerce and industry are pursued and degrees are given as bachelor of arts or mercantile or mechanical experts. A normal school for teachers, founded by royal order in 1865, and elevated to higher grade by royal order of 1894, is an institution of primary instruction and is in the care of the Jesuits. In all of these colleges the pupils are divided into two classes, resident and nonresident, except in the seminary, where they are all residents. There are besides in the capital the Naval School, the School of Arts and Trades, which has combined with it the old Academy of Design, and the School of Agriculture. This institution publishes the Official Gazette, the Ecclesiastical Bulletin of the archbishopric of Manila, and various daily papers and reviews. For the education of girls there are, first, the College of Santa Isabel, which has united with the old College of Santa Potenciana, both of remote foundation; second, the College of Santa Rosa and the Municipal School, under the care of the Sisters of San Vicente de Paul; third, the College of Santa Catalina, in charge of the Dominican sisters, and, fourth, the Beaterio of the Jesuits. Just on the edge of the city is the College of the Concepcion, called the Concordia, and that of Loban, both in charge of the Sisters of San Vicente de Paul: and about a league from Manila is the orphan asylum of Nandaloyan, under the direction of the Augustin nuns.

INSTITUTIONS OF CHARITY.

Within the walled city is a large civil hospital; outside a military hospital and the Hospicio of San José. The Sisters of Charity serve in all of these. There is also a leper hospital; also a government pawn shop. There is a large jail and a penitentiary having 800 inmates, and in both of these useful trades are taught.

SUBURBS OF MANILA AND TOWNS OF THE PROVINCE.

Three bridges—the bridge of Spain, the Suspension bridge, and the Ayala bridge—span the Pasig River and unite the city with its populous suburbs.

BINONDO.

This is the most important suburb, and in it domestic and foreign commerce are centralized. It has some fine buildings, among which may be mentioned the church, the Hotel de Oriente, the Spanish bank, the post-office, the stores along the Escolta, and others. Its streets are wide and well cared for.

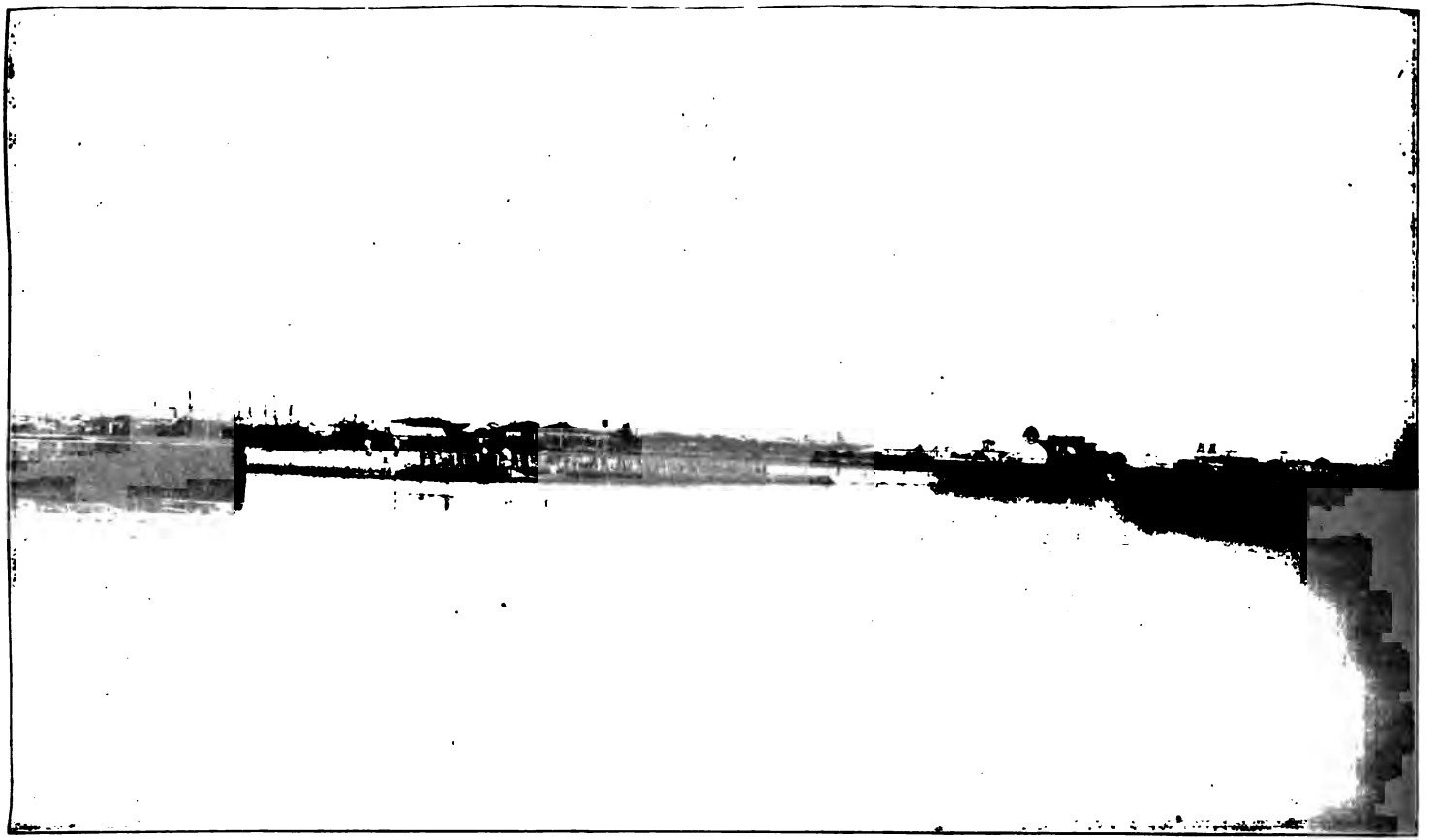
TONDO.

This populous suburb is situated to the north of Binondo. Although it has many nipa houses, their construction is no longer permitted within the area bounded by Divisoria street. Plate 18 gives a good idea of this suburb and the traffic on one of its canals.

The other suburbs within the municipal radius are: Trozo or San Jose, Santa Cruz, Sampalog, Quiapo, San Miguel, Ermita, Paco, or San Fernando de Dilao, and Arroceros. San Miguel and San Sebastian are noted for the elegance of their residences. The magnificent church of the Recoletos of San Augustin is located in San Sebastian. San Anton and Sampalog contain many beautiful houses and wide streets, among the latter being the wide avenues of Iris and of Alix. Ermita also should be mentioned because of its elegant houses of modern construction, and the magnificent building of the Normal School and the observatory. The population of Manila and its suburbs is about 300,000.

TOWNS.

Among the most important are the following: Malabon, with a population of 20,000, which is connected with Manila by a steam tramway having hourly trains. The church is very large; it has two fine towers. A sugar refinery is located here. The orphan asylum is under the direction of the Augustin friars. The principal wealth of the town is in its fisheries. Pasig, a town of 20,900 inhabitants, has, besides its church and convent, many fine houses and a school for the education of young girls. Bateros, with 9,200 inhabitants, is notable for the peculiar industry of duck raising. Immense flocks of ducks are raised for the purpose of obtaining their eggs, which are much esteemed by the natives. Mariquina, with a population of 11,000, is celebrated because of an iron spring, known as the Chorrillo, whose waters have cured many invalids. Malate, with a population of 6,100, is noted for its many beautiful houses recently constructed. Santa



THE PORT OF MANILA.

THE
PUBLIC
ASTOR
TILDEN

Anna, with a population of 6,000, is known on account of the fine laces manufactured by the native women. San Pedro Macati occupies a picturesque position on the banks of the Pasig.

PRODUCTS.

Besides the ordinary products of the country, such as rice, sugar cane, corn, etc., this province cultivates and exports large quantities of betel, a plant whose aromatic leaf forms the principal part of the buyo. Pasay is a town which devotes itself almost entirely to this branch of agriculture.

COMMERCE AND INDUSTRIES.

In Manila and its towns there are many establishments for the manufacture of tobacco, ice, thread, cord, and rope, iron factories, steam sawmills, etc. Commerce in copra, which promises a great deal in the future, consists in exporting to Europe the dried meat of the cocoanut, from which the oil is afterwards extracted. Almost all the commerce of the Philippines, domestic as well as foreign, is carried on through Manila. There are many Spanish and foreign houses which have branches inthe provinces.

THE PORT AND WAYS OF COMMUNICATION.

In the port are ships from all the nations of the world. Many of the smaller craft anchor within the river in order to facilitate unloading. Daily steamers leave for various parts on the island of Luzon, and weekly steamers to the distant provinces and to China. There are bimonthly subsidized mail steamers for all points in the archipelago and for Europe. Manila is in communication by wagon road and railroad with the provinces of Bulacan, Pampanga, Tarloc, and Pan gasinan; by water with the Laguna De Bay and the provinces bordering on it, and by sea with all of the provinces of the islands.

PROVINCE OR DISTRICT OF CAVITE.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

The province is bounded on the north by the Bay of Manila, on the south by Batangas, on the east by Batangas and Manila, and on the west by the China Sea. The country is mountainous at some 8 kilometers from the coast, rising gradually from the sea. The most mountainous part of the province is the southwest and south, where the mountain slopes of Sungay are found.

AREA AND INHABITANTS.

The province has an area of 1,348 square kilometers and a population of 134,569, the most of these Tagalogs.

TOWNS.

The capital is Cavite, a seaport and fortified town. The Tagalos call it Cauit; that is to say, fishhook, which is the shape taken by the bay. It is united to the island by a narrow isthmus, which appears to

be artificial. Cavite is also called "the port." The streets are quite straight, although somewhat narrow. The houses are of masonry. There is a fine parochial church, two convents, and a fine large hospital. There is also the Sanctuary of Nuestra Senora, called Porta Baga, a well-equipped arsenal, a dockyard, and a fair dry dock, where the shipping of the archipelago is repaired and cleaned. There are some tobacco factories of importance; steam, hydraulic, and handmills for the manufacture of sugar, sawmills, soap and oil factories, and distilleries. The city has a population of 3,000.

Other towns of importance are Bacoor, Cavite Vicjo, San Roque, and Caridad, all situated on the Bay of Bacoor. Caridada has a population of more than 6,000, San Roque 11,500, Cavite Vicjo 9,800, and Bacoor 13,600. On the western coast are Rosario with 6,600, Santa Cruz with 7,600, Naic with 7,400, and Ternate with 2,200 inhabitants. In the interior toward the north the towns of most importance are Imus with 14,000, Carmona with 3,167, San Francisco de Malabon with 8,700 inhabitants; in the central part of the province, Dasnarimas with 3,500, Silan with 9,100, Maragonbon with 10,400, Indan with 14,700 inhabitants, and in the south, Bailin with 4,189 and Alfonso with 7,089. There is a total of 22 towns and 108 villages.

LANGUAGES.

Spanish is spoken in the port of Cavite, Estanzuela, and San Roque, and Tagalog in the other towns.

PRODUCTS, INDUSTRIES, COMMERCE, AND WAYS OF COMMUNICATION.

The soil in the vicinity of the lowland towns produces rice of an excellent quality, which is greatly esteemed in the archipelago. Coffee of the best quality is gathered in Indan, Silan, and Alfonso. The area under cultivation is increasing steadily. Corn, sugar cane, and chocolate are also grown. In the southwestern region there are fine forests of large and well-grown trees, whose wood is serviceable for the construction of ships and for making furniture. There is excellent hunting in the province. The live stock in the province includes 15,000 buffalo (carabaos), 9,000 cattle, 6,000 hogs, and 5,000 horses. The principal industries of this province consist, in the elevated towns, in the manufacture of cloth from hemp and cotton and the production of sugar, there being more than 160 sugar mills; in the coast towns the fisheries, the manufacture of salt, and the cultivation of rice. Commerce is not much developed. Cloth and hardware are imported, and rice, coffee, sugar, and fish exported. There are good roads in the province, uniting the coast towns, but many of these are impassable during the rainy season. Other roads cross in all directions, uniting the principal towns and villages. Communication with Manila is by the bay and by land along the road following the coast; with Batangas by the road from Alfonso to Tuy, and with the Laguna by the road from Carmona to Biñan.

DISTRICT OR PROVINCE OF CORREGIDOR AND THE ADJACENT ISLANDS.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

The island of Corregidor, lying at the entrance to the bay of Manila, has on the north the strait called Boca-chica, which separates

THE BRIDGE OF SPAIN (MANILA).

THE
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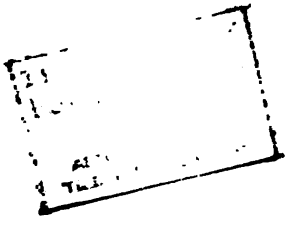
PLATE XI.

ASTOR
TILDEN

THE ESCOLTA (STREET IN MANILA).



CANAL SCENE IN TONDO (MANILA).

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DISTRICT OF PACO (MANILA).

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A STREET OF MANILA IN RAINY SEASON.

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A STREET OF MANILA IN RAINY SEASON.

it from Bataan; on the southeast the Boca-grande, fronting on the southwest Cavite. The island of Corregidor extends from west-southwest to east-northeast from Point Horadada to Point Buri for a distance of 4 miles in greatest length, its breadth being very unequal on account of the irregularity in form. It is 26½ miles distant from the mouth of the river Pasig of Manila. At about one-third of its length there is a low-lying, narrow, sandy isthmus which unites two high mountains. The eastern part is high, while the western part gradually rises to form an extensive plateau, which is the highest part of the island. On this are the semaphore and light-house of the port of Manila. In general all of the western part of the island is composed of elevated crests and bluffs, frequently cut by deep fissures, whose bottoms during the rainy season are converted into so many ponds. Toward the northern part of the isthmus, on a little bay formed by the coast, is situated the town of San Jose. This bay offers a deep and well-protected anchorage for all classes of ships during the southwest and northeast monsoons. There is a good anchorage almost entirely inclosed formed by this island and Pulo Caballo, which is a small island situated to the northeast of the central part of Corregidor.

This island also has a light-house. On all of the western part of the island there is an abundant supply of excellent water filtering through from the mountains, and three springs, which at all times furnish pure water, are located near the anchorage, so that it is very easy for ships to procure water here. The climate is even, temperate, and in general very healthful, many of the natives reaching old age. This island, on account of its isolated situation and its healthful conditions, seems more suitable for the establishment of a sanitarium or leper hospital. From a military view point it may be considered the only base of defense of the important bay of Manila, being as suitable for a torpedo station as for a shelter for ships designated to defend the entrance, its elevation making it a good outlook station. The soil is red clay, covered with great rocks, rendering its cultivation very difficult. The subsoil is a sandy clay rock, soft in some places and in others hard, white, and of a slaty appearance, disposed in diagonal layers of little thickness, which are easily broken up. In other parts it is sandy granite, uniformly hard. The few small regions where the soil on account of its situation and quality is favorable for cultivation are cleared off and sown to rice, bananas, corn, sweet potatoes, etc.

As the character of the ground demands incessant work, and this is distasteful to the native, who is accustomed to plant in virgin soil and then leave the crop to the care of Providence, these cultivated areas are but few and do not produce as much as they should, or sufficient to provide a small number of inhabitants. Another reason why these lands are not cultivated is the prevalence of the winds, which are quite violent during the monsoons, particularly that from the north, which, in addition to being strong, are very dry. The island pastures about 200 head of cattle. The inhabitants have no other occupation than fishing, which is not carried on to any great extent. There is no commerce, articles of prime necessity coming from Cavite and the adjacent coast of Bataan and Cavite. The only town is San Jose, with 420 inhabitants.

LANGUAGES.

As in Cavite, both Spanish and Tagalog are spoken.

ADJACENT ISLANDS.

Pulo Caballo, situated to the south, is the largest of the islands which surround Corregidor. It is very rocky, and possesses limited vegitation; there are but few inhabitants. On the northeastern extremity there is a light-house showing a white light. La Monja is a conical rock 40 meters in height, situated 2½ miles to the west southwest of the western part of the island of Corregidor. El Fraile is a rugged rock, rising clear of the water, almost to the south of the light-house on the Pulo Caballo and to the northwest of Punta Restinga in Cavite. Los Cochinos or Lechones are five low rocks visible one-half mile to the south of the point southwest of the port of Mariveles. The most eastern of these is called Pulo Monti. To the northeast of Corregidor are two little islands smaller than La Monja, called Horadadas and Santa Amalia.

THE PROVINCE OR DISTRICT OF MORONG AND THE ISLAND OF TALIN.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

This province or district is bounded on the north by Bulacan, on the south by the Laguna de Bay, on the east by the district of Infanta and Laguna, and on the west by Manila. The country, although broken in some parts, has many extensive plains, which would be excellent for cultivation were it not for the floods from the lake, which often destroy the crops.

AREA AND INHABITANTS.

The area, including Talin, is 1,656 square kilometers, and the population 46,940, almost all Tagalogs. In the mountain chain of San Mateo a few Negritos are found.

TOWNS.

The capital, Morong, has a population of 10,000. It has some fine buildings, such as the church, the convent, and the town hall. The principal towns, almost all situated near the lake, are: Jala Jala, with 15,000 inhabitants; Tanay, with 4,774; Bares, with 1,500; Binangonan, with 7,801; Cardona, with 10,000; Taytay, with 6,684, and Cainta, with 2,417. In the interior is Antipolo, with a population of 3,700. This place is famous throughout the Philippines as the sanctuary of the miraculous image of Nuestra Señora de la Paz. There is a total of 14 towns and 5 villages.

LANGUAGES.

Tagalog is used almost exclusively, even by the Negritos, who come down to trade with the Tagalogs.

PRODUCTS, COMMERCE, AND WAYS OF COMMUNICATION.

This province is not well adapted to agriculture, but nevertheless rice and sugar cane are cultivated in considerable quantities; also corn, tobacco, and bamboo. In the mountains molave, narra, acle, banaba, baticulin, dongon, calamansanay, tindalo, and a small variety of bamboo

TRANSPORTING GRASS (MANILA).

UNIVERSITY OF CALIFORNIA

RAFTS AND BANCAS (LARGE BOATS).

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PLATE XIX.

TAGALOS CARRYING A PIANO.

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PLATE XX.

SALT BASINS (CAVITE).

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and rattan are found. The region about San Guillermo de Bosoboso, Jala Jala, Tanay, Baras, and Pililla abounds in large game. The industries of this district consist mainly in the manufacture of lime, rush mats, and clothing for the natives. Most of the commerce is in sugar, lime, cattle, and deer; bamboo, wood, and fish as articles of export; and in the interior of the district rice, corn, cattle, fowls, fish, fruit, and tobacco. The towns are united by roads and paths, and the district is in communication with the adjacent provinces by land and with the rest of the archipelago by the Laguna de Bay. The connection with the province of Manila by land is along the road from Cainta to Mariquina, and with the province of Laguna from Pililla to Santa Maria.

THE ISLAND OF TALIM.

The island of Talim, situated to the south of and very near to Point Quinabulasan, extends from north to south in the form of an elongated oval. It is 14 kilometers long and about 6 kilometers broad at the widest part. A mountain range runs from north to south in the island. From these mountains a fine stone is obtained, which during the last few years has been used for construction in the new works of the port. Its area is about 40 square kilometers. It has but few inhabitants, who occupy small villages or hamlets along the shore. Many of these inhabitants are employed in the quarries of the works of the port. The principal villages are: Banla, Tabong, Quinagatang, Subag, and Aanosa. Along the south coast are several small islands of little importance, the largest of these being Olagitan. To the west of the strait which separates Talim from Morong is the little island of Tusan.

PROVINCE OF LA LAGUNA.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

The large lake or bay, having a circumference of 165 kilometers, gives its name to this province. It is bounded on the north by the district of Morong and Bulacan, on the east by the mountain range which separates it from the Pacific, on the south by the provinces of Tabayas and Batangas, and on the west by Cavite and Manila. The country is much broken toward the boundaries of Morong, but on account of the multitude of rivers is very fertile, especially in the northwest and east, where it is quite level. The province is 14 leagues in length and the same in breadth, including the lake. The lake sometimes becomes very rough, almost like the ocean, causing the shipwreck at times of boats of good size. The shape of Mount Banajao and the waterfall at Bocotan are worthy of mention. The latter will be described in speaking of the town of Majayjay. The hot mineral baths of Aguas Santas and the grotto of Maquiling are also worthy of mention.

AREA AND INHABITANTS.

The province has an area of 2,603 square kilometers, and a population of 169,983, almost all of whom belong to the Tagalog race.

TOWNS.

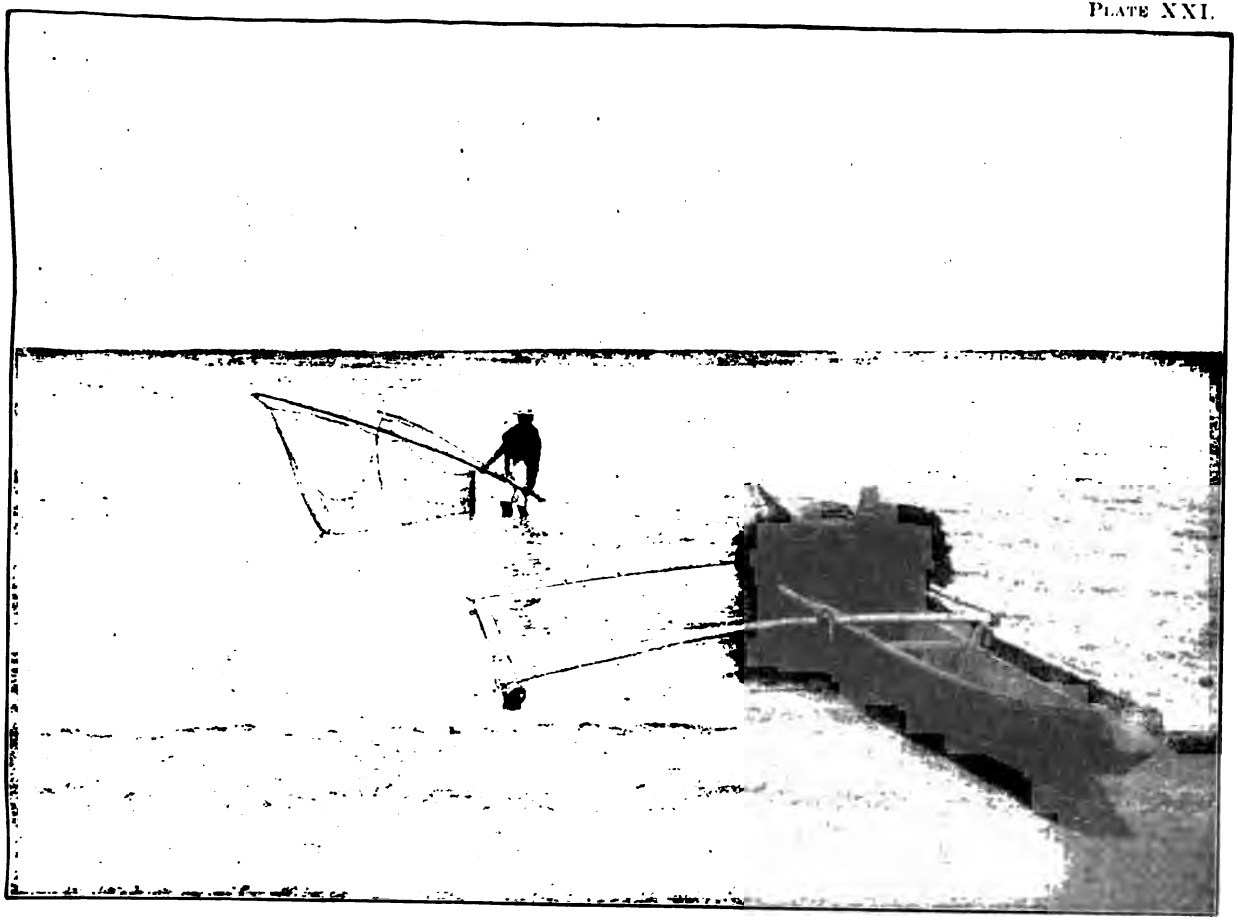
The capital, Santa Cruz, has a population of 13,800. It has a magnificent church and hospital belonging to the Franciscans, and many notable public and private buildings. The principal towns in the vicinity of the eastern shore of the lake are: Siniloan, with 6,400 inhabitants; Pangil, with 2,481; Paete, with 3,000; Pila, with 5,600; Bay, on the southern shore, with 2,400; Los Baños, with 2,850, and Calamba, with 11,476. On the west coast, Cabuyao, with 11,181; Santa Rosa, with 9,300; Biñang, with 18,000; San Pedro de Tunasan, with 3,800 inhabitants. In the interior, Pagsanjan, to the east of Santa Cruz, with 6,300, and Majayjay, to the south of Pagsanjan, with 6,634. This town is famous for being in the vicinity of the waterfall of Botocan, formed by the river Camatian. This river, having its source to the east of the great mountain Banajao, receives during its course of nine miles the waters of several large branches, runs through the mountainous country, which at times forms canyons, until it reaches Salto, where there is an abyss of 140 meters deep. There the waters, extending themselves to a width of 90 feet deep, fall perpendicularly. The water in its fall is dashed into spray, presenting the appearance of a cloud of vapor, which, being pierced by the rays of the sun, presents a thousand color illusions, the appearance being sometimes like that of a distant fire. To the south of Santa Cruz and southwest of Mayjayjay is the town Nagcarlang, famous for its cemetery, which is, perhaps, the best in the Philippines. The town has a population of 12,976. The province has a total of 33 towns, 15 villages, and about 400 hamlets.

LANGUAGES.

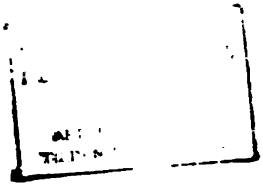
Tagalog is the only language spoken.

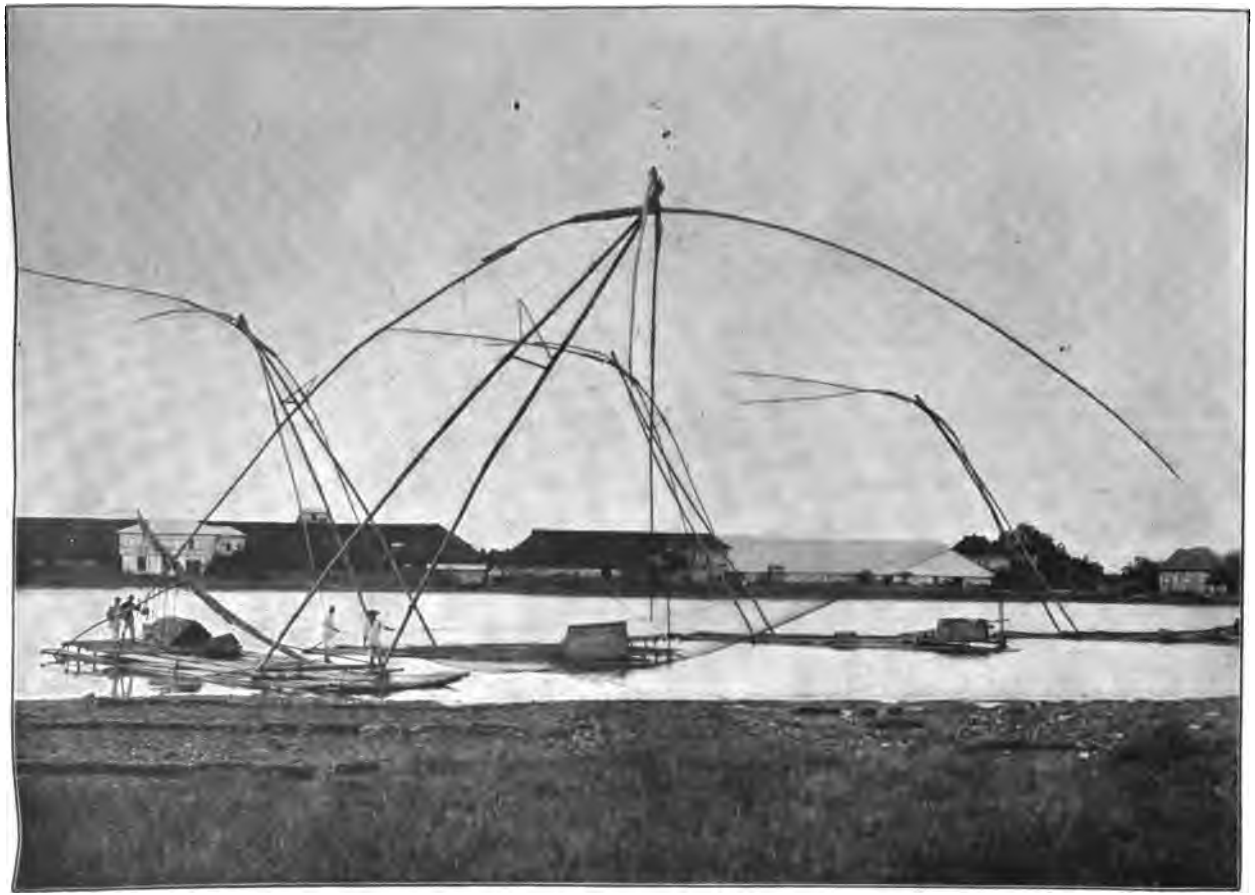
PRODUCTS, INDUSTRIES, COMMERCE, AND WAYS OF COMMUNICATION.

This province may be considered the garden of the Philippines. Its soil produces every kind of tropical plant and tree. Among the products are sugar cane, rice, the betel nut, corn, coffee, and the cocoanut, there being a flourishing trade in cocoanut oil. The area of cultivated land exceeds 423 square kilometers. There are in the province more than 45,000 head of live stock, including horses, cattle, sheep, goats, hogs, and buffaloes. There are large cocoanut wine distilleries, cabinet shops, and blacksmith shops, the latter celebrated for the bolos (large knives) which they make. There are more than 210 mills for the extraction of cocoanut oil. The fruits grown in this province are exquisite. They are mostly exported to Manila. The lanzon and the chicomamē are worthy of mention. The province communicates with the adjacent provinces by cart roads. One from San Paglo runs to Dolores and Tidon, in Tayabas; another from Calamba to Santo Tomas, in Batangas; another from Biñan to Muntinlupa, in Manila; another from Santa Maria to Pililla, in Morong. The waterway to Manila and the bay of Manila by the River Pasig is excellent.

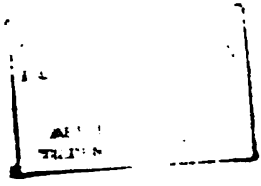


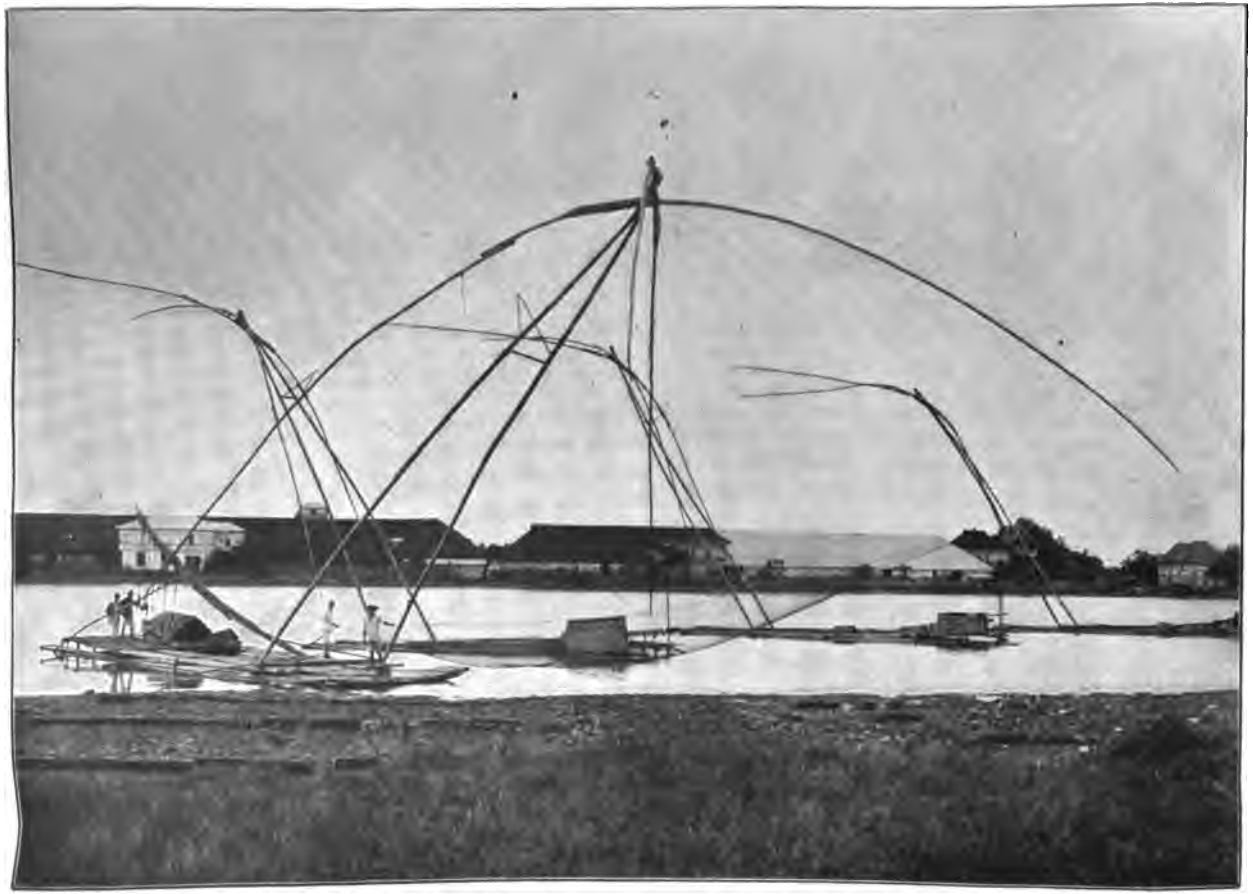
FISHING WITH NETS.





FILIPINOS FISHING WITH POLE-RIGGED NETS.





FILIPINOS FISHING WITH POLE-RIGGED NETS.

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THE PROVINCE OF BATANGAS.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

This rich and well-cultivated province is bounded on the north by Cavite and La Laguna, on the south and west by the sea, and on the east by the province and bay of Tayabas. It was formerly known as Balayan, Comintan, and Taal province. It measures 12 leagues from north to south and 20 from east to west. The country is in general uneven. From the great mountain chain of Sungay the country gradually slopes to the sea, forming wide valleys between the small spurs and ridges, which generally disappear before reaching the coast. Point Santiago and Point Cagador are the terminal points of mountainous land. The latter of these separates the magnificent bays of Balayan and Batangas. The eastern part is more mountainous. The grottos of the town of San Juan are of great depth and almost unexplored.

AREA AND INHABITANTS.

The province has an area of 3,130 square kilometers and a population of 311,180, almost all Tagalogs.

TOWNS.

The capital, Batangas, situated on the bay of the same name, in the south central part of the province, has a population of 37,400. It has some fine buildings, such as the church, the convent, the government house, the city hall, the prison, and many private residences. The cemetery is located in a well-kept open space, and is worthy of a people so religious and wealthy. This province contains the most populous towns of the archipelago. The most important along the southern coast are: Balayan, a port on the bay of the same name, with 22,126 inhabitants; Calaca, on the same bay, with 11,745; Lemerey, on the same bay, and near the Mansipit River, with 13,000; Taal, near Lemerey, on the opposite bank of the same river, with 15,921; Battang, on the bay of Batangas, one of the most populous of the towns, with a population of 38,300. The towns in the eastern part of the province are: San Juan de Bocdoc, with a population of 13,456, and Lobo, with 6,202. On the western coast are: Lian and Nasugbu, with 3,889 and 8,263, respectively. To the north of Lake Taal are: Talasay, with 8,200 inhabitants, and near the boundary of the province of Laguna, Santo Tomas, with a population of 10,607, and Tanauan, with a population of 21,513. In the interior are: Lipa, with 39,559 inhabitants; Rosario, with 13,606; San Jose, with 10,455; Ibaan and Taisan, each with more than 9,000. There are in all 22 towns, 720 villages, and 7 hamlets.

LANGUAGES.

Tagalog is exclusively spoken.

PRODUCTS, INDUSTRY, COMMERCE, AND WAYS OF COMMUNICATION.

About 100,000 piculs of coffee are produced annually and 150,000 piculs of sugar. Rice, chocolate, and various other articles are also produced.

INDUSTRIES.

Many kinds of cloth of the finest texture are produced in looms of the most simple construction and at very slight cost. These fabrics are made of silk, hemp, and cotton, and brightly dyed. The value of the exports of this province is double that of the imports. In the early part of February in each year there is a notable fair held in the capital town, which attracts large numbers of people. It is in the nature of an agricultural and industrial exposition, and offers premiums, both honorary and in money, for the best exhibits. The fair held in Taal the 8th of December is also one of importance.

There are 146,576 head of live stock in the province, whose value is estimated at $1,691,282. In the mountains of San Juan, Santo Tomas, and Rosario there are many fine woods suitable for building purposes and the manufacture of furniture. To reach Batangas from Manila by sea it is necessary to cross the bay of Manila and follow the coast of Cavite. There are three steamers on this line. The roads are all good during the dry season, but during the rainy season many of them become impassable on account of the character of the soil, which is clay. From the capital town there are two main cart roads, one to the northeast and one to the north. There is communication by sea with the entire archipelago. By land there are cart roads to Laguna by way of Santo Tomas and Calamba, to Tayabas by way of Rosario and Tindon, and to Cavite from Balayan by footpath to the village of Caitinja.

FREIGHT BOATS AND RAFTS.

AL
TH

ISLAND OF TALIM.
(Quarry for stone.)

THE RIVULET BOTOCAN (NEAR LAGUNA DE BAY).

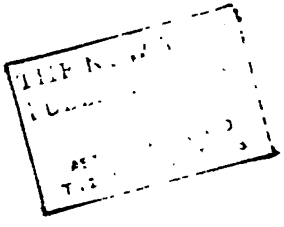
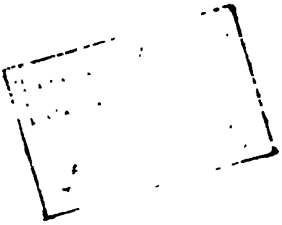


PLATE XXVI.

FALLS OF THE BOTOCAN (MAJAYJAY).



THE BOTOCAN (NEAR THE FALLS).

NATIVE BOAT WITH SAILS.

CHAPTER V.

SOUTH LUZON.

PROVINCE OF TAYABAS.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

The irregular shape of this province makes it difficult to indicate the boundaries with precision. It may be said that the north boundary is formed by the province of Laguna and the Pacific Ocean. On the east it is bounded by Ambos Camarines, on the south by the sea of Mindoro, and on the west by Batangas and La Laguna. The country is exceedingly mountainous, and the configuration very irregular. The distance from Gumaca, on the north, to Laguimanoc, on the south, is 6 leagues; from Point Dapdap, on the north, to the head of Bondoc, on the south, more than 20 leagues, and from Batangas to the head of Bondoc more than 30. That part of the country between Gumaca and Laguimanoc is a kind of isthmus, which divides the province into two parts. Throughout the length of the province, as far as Bondoc, there is a central mountain chain, which sends out smaller chains of less importance into the interior. These are covered with vegetation, and send out in all directions a large number of rivers and streams.

AREA AND INHABITANTS.

The area of this province is 5,893 square kilometers and the population 109,780. Of these the inhabitants of the western part and on the western slope of the peninsula of Tayabas, which terminates in Point Bondoc (or Cabeza Bondoc), are almost all Tagalogs. Those who inhabit the country near Camarines and the eastern slope of the peninsula are Vicols.

TOWNS.

The capital, Tayabas, has a population of 16,900. A century ago Calanag, on the coast of the Pacific, was the capital. The towns of most importance are: Near the Laguna boundary, Mauban, with 10,288 inhabitants; Lucban, with 11,560; Dolores, with 2,500, and Tiaon, with 5,979. On the Pacific coast are: Antimonan, or Lanoon, a town situated on an excellent port, with a population of 10,712; Gumaca, with 7,431 inhabitants; Calanag, with 2,671, situated on the western coast of the peninsula; Guiangan, with 2,216; San Narciso, near the southern coast, with 2,064; Mulanay, with 2,464; Catanoan, with 3,754; Nacalelon, with 3,473; Pitogo, with 2,500; Pagabilao, near Tayabas, with 6,152. This province has a total of 20 towns, 425 villages, and 5 hamlets.

LANGUAGES.

Tagalog is spoken in the western part and Vicol in the eastern part of the peninsula of Tayabas.

PRODUCTS, INDUSTRIES, COMMERCE, AND WAYS OF COMMUNICATION.

The forests produce a great variety of excellent woods, especially those suitable for shipbuilding. These are sent to the various parts of the Philippines and also to foreign countries. The forests also produce large quantities of wax, pitch, tar, rosin, and cobonegro wood. There are thousands of head of live stock grazing in the fields. Cocoanut oil is manufactured in large quantities. The rice which is grown is of excellent quality. The natives manufacture a great many hats, boxes, and various kinds of cloth. The inhabitants of Tayabas grow a special kind of seed called lumban, which produces an excellent dry oil containing a large amount of oleaginous substance. There are a number of dock and ship yards where large numbers of boats for the coast trade are built. From dumgal, an exceedingly bitter wood, cups are made, in which in a few hours water takes a taste similar to quinine, and whose effects are identical with those produced by this plant. There are about 300 looms where hemp and pineapple fiber cloth are woven. There are about 40 cocoanut oil mills in the province. This province has communication with all the rest of the archipelago by sea; by land with the Laguna province by way of Lucban, Dolores, and Tiaon; with Camarines by way of Calanag and Guinayangan. There is much trade along the coasts.

ADJACENT ISLANDS.

CABALETE ISLAND.

In front of Point Salag, in the most northern part of the peninsula, is the little island of Cabalete, traversed from northwest to southeast by a little mountain range, which is covered with trees and vegetation.

ALABAT ISLAND.

To the southeast of Cabalete, in the great bay of Malaon, there is an island called Alabat, extending from northwest to southeast, likewise traversed by a range of mountains covered with vegetation. Here are found many kinds of woods most suitable for building purposes and furniture making. The exportation of these woods would undoubtedly have been greater were it not that the place is little known, as boats seldom go to this coast, as it is very dangerous during a part of the year. This island is inhabited by a few Tagalog families, who live in villages and hamlets along the western coast. The principal of these is Sangirin in the north. In the mountains to the north of this village coal is found. In the central part of the island the valuable wood known as camagon is found, and in the southern part silangon.

PASIG ISLAND.

Near Point Panjan, to the east of Alabat, is the little island of Pasig, united to Luzon by means of a reef.

A NATIVE SAWMILL.

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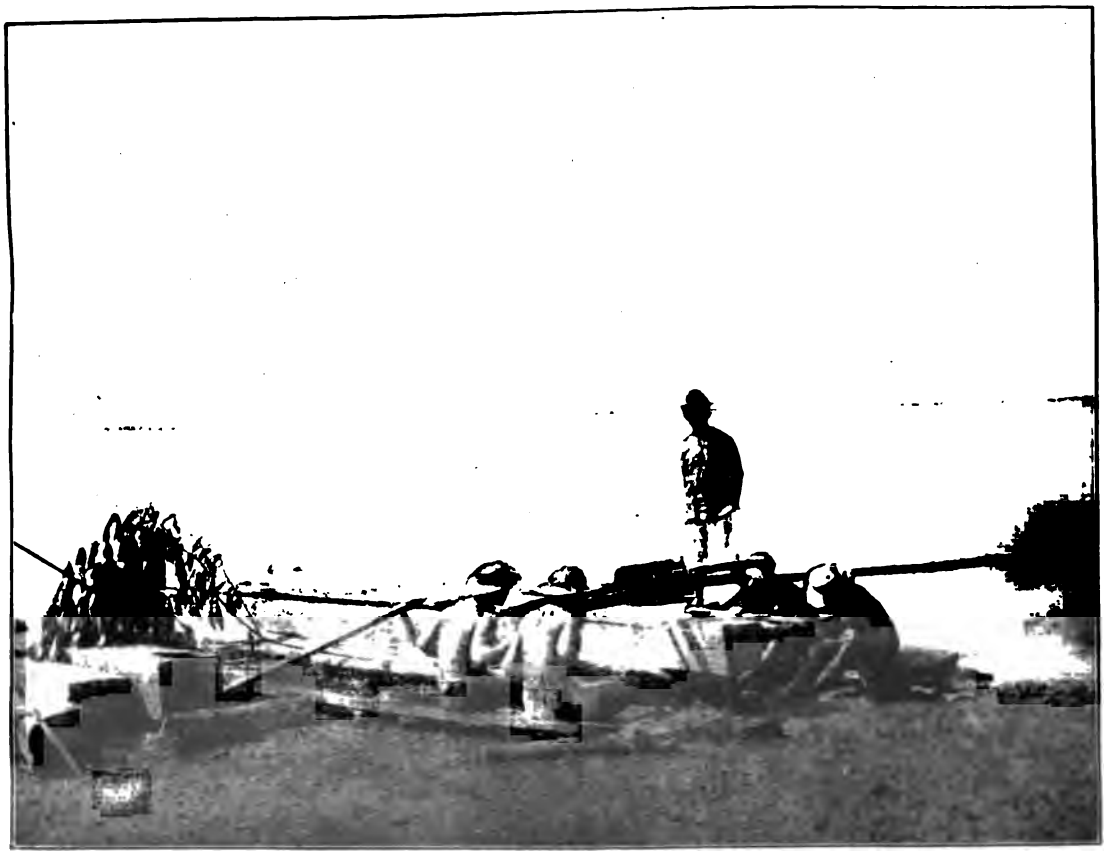

CHINAMEN SAWING TIMBERS.

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PAGDILAO GRANDE.

This island is almost united to the coast of Luzon at Point Puaya and forms with this coast the anchorages of Pagdilao on the west and that between the islands on the south and the island of Laguimanoc on the east. It is triangular in shape, extending about 4 miles from north to south and 3 miles from east to west, Mount Mitra towering above the rest of the islands. It is surrounded by a little island and huge rocks, the most of which are above water at high tide.

PAGBILAO CHICO.

This island is situated to the east of Pagdilao Grande and is united to it by a narrow sand bar, in which the island terminates on the northwest.

PROVINCE OF AMBOS CAMARINES.

LIMITS AND GENERAL CONDITIONS OF THE COUNTRY.

Recently the two provinces of North Camarines and South Camarines were united into a single province called Ambos Camarines. It is bounded on the north by the Pacific Ocean, on the south by Mindoro Sea, onthe west by Tayabas, and on the east by Albay and the Pacific Ocean or Bay of Lagonoy. The northern part of the province is crossed by many large rivers and covered by high mountains having luxuriant vegetation on them. These mountains form a chain, which is a continuation of that traversing the province of Tayabas. The southern part is likewise mountainous, its extensive valleys being watered by rivers and creeks which frequently flood the lowlands and destroy the crops. There are 48 rivers and 296 creeks in this region. The 53 waterfalls, some of them having a fall of 15 meters, prove the rugged character of this region. Near the town of Ruba, south of the Grotto of Orocosoc, there is a lake having a perimeter of 5,184 meters and a depth of 3.34 meters. There is another lake on Mount Hanti from which the waters filter into the Grotto of Calangitan.

AREA AND INHABITANTS.

The area of Ambos Camarines, including the adjacent islands, is 7,897 square kilometers, and has a registered population of 194,022. The most of these are Vicols, indigenous and ancient people of this region. Two tribes of Negritos are found in this province; one in the north, not far from the boundaries of Tayabas, in the mountainous region of Capolonga, the other in the vicinity of Triga. On the tops of the Isarog Mountains there dwell certain savages called Cimarromes del Isarog (wild men of Isarog). Some of these are also found in the spurs of these mountains, which extend into the so-called peninsula of Camarines. There are a few Igorrotes on Mount Triga, to the south-southeast of Isarog.

TOWNS.

The capital is Nueva Caceres, with a population of 7,395. This was formerly the seat of the Episcopal see of these islands and is now the residence of civil and ecclesiastical authority. It has some fine build-

ings, such as the cathedral, the Episcopal palace, the government house, the town hall, the seminary, the hospital, and the girls' school. This school is at the same time a normal school for female teachers and was founded by His Excellency Señor Gaiñza O. P. The most important towns are Daet, the former capital of North Camarines, situated about a mile and a half from the sea between the Daet River and one of its branches, having a population of 10,332; Talisay, to the northwest of Daet, has a population of 3,600; Labo, farther inland and also to the northwest of Daet, 4,200; Paracale, celebrated for its ancient mines, 3,824. In North Camarines the most important towns are Caramoan, with 6,100 inhabitants; Tinambac, on the southern part of the Bay of San Miguel; Laganoy, on the eastern coast of the peninsula, with 3,549 inhabitants; San Jose, to the south of Laganoy, with 9,212, and Goa, west-northwest of San Jose, with 7,608. Along the coast to the south are Ragay, with 900, and Pasacao, with 1,183 inhabitants. In the interior, along the banks of the large river Vicol, there are towns of importance, among which may be mentioned Bato, with 5,035 inhabitants; Minaladac, with 3,869; San Fernando, with 2,844; Camaligan, with 5,050; Canaman, with 5,248; Magarao, with 5,293, and Cabalanga, not far from the coast and south of the great Bay of San Miguel. There are in the province 44 towns, 180 villages, and 221 hamlets.

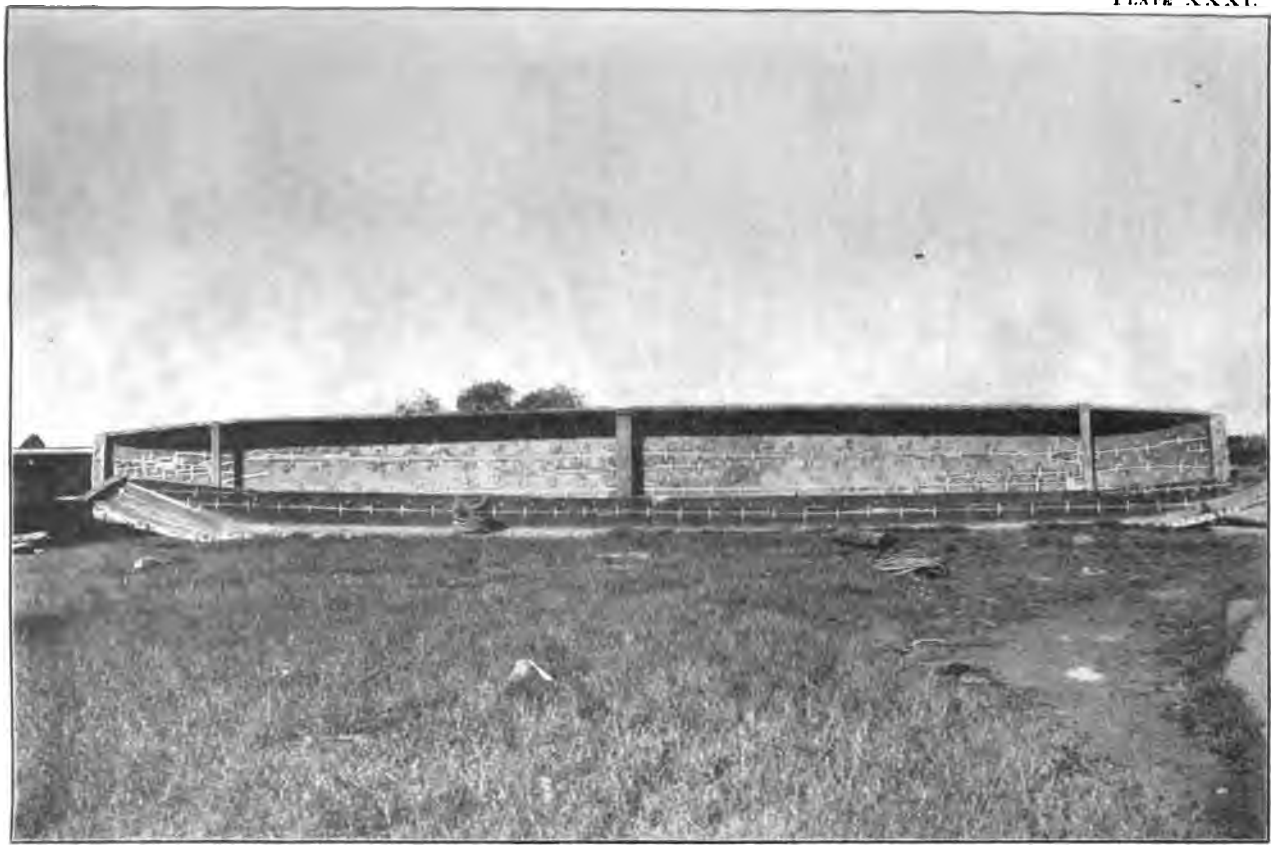
LANGUAGES.

Vicol is generally spoken, though in some places Tagalog is used. The savages and various tribes of Negritos speak their own peculiar dialects, although those who come down to the towns to trade understand and speak Vicol.

PRODUCTS, INDUSTRIES, COMMERCE, AND WAYS OF COMMUNICATION.

The forest products are woods of excellent quality suitable for building, such as baticulin, molave, and narra in the northern part, and anajan, cedro, mangachapuy, naya, palo-maria, tindole, acle, balete, bagainto, camagon, jaral, and also narra and molave in the southern part. The forests also produce resins, pitch, tar, and large quantities of wax and honey. Among mineral products are gold, silver, iron, lead, and copper, which are found in the mines worked at Mambulao and those at Taracale. In the southern part there are mines of pit coal. Marble and gypsum quarries are also found. In the southern part there are no mines known, but many of the rivers carry gold. Agriculture is well advanced, hemp being the especial object of cultivation. Rice and sugar are produced, and are articles of export. In the center of the peninsula of Camarines is the majestic mountain of Isarog, inhabited by pagans.

To the south and west of this mountain are extensive and fertile valleys, where excellent rice, chocolate superior to that from the Moluccas, corn, hemp, sugar cane, and all kinds of bananas are grown. There are alcohol distilleries, sugar mills, and refineries; distilleries for the manufacture of the essence of ilang-ilang; silversmiths' shops, shoe shops, and looms, especially those for the manufacture of sinamay and guinaras. There are lao hemp presses, brickyards, and fisheries. There is an abundance of live stock of all kinds, particularly buffalos and hogs. Ways of communication in the interior are very few, espe-



A CASCO READY FOR CALKING.

cially in the north, where there are four cart roads. One of these runs parallel to the coast of the Bay of Ragay and communicates with the province of Tayabas. It continues as far as Daet, on the Pacific coast, and from there goes to Indan. There is communication by sea with the entire archipelago. In the south the ways of communication between the towns and with the rest of the archipelago are better and more numerous. From Port Pasacao one can easily go to Nueva Caceres, and from there in every direction, there being communication with Albay from Triga to Polonguy, and from Tigaon to Sangay.

ADJACENT ISLANDS.

There are many islands adjacent to the coast of this province, especially on the north. The principal ones are as follows: To the north of Daet are the Calagnas islands, a group composed of various inhabited islands covered with vegetation. The largest of these, 4 kilometers long by 1½ kilometers wide, is 22 kilometers from the coast. The islands which border this island, known as Tinaga, are Pinaguapan, Samar, Maculad, Ingatan, Siata, Cagbalisan, and Calagua. To the north of Mambulao and of Capalonga there is a multitude of islands and rock, which render navigation along this coast most difficult. To the northeast of Indan is the small island of Quinamanocan, which is covered with vegetation. Canino, Canton, and a multitude of other small islands constitute a group to the east of Daet at the entrance of the Bay of San Miguel. The little island of Canit is found at the head of this bay, and near its eastern coast, to the north, is the small island of San Miguel. The coast of the peninsula of South Camarines is bordered by as many small islands, as may be seen in Chapter I, which discusses the configuration of Luzon.

PROVINCE OF ALBAY.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

The modern and commercial province of Albay, near the extreme southeast of Luzon, is bounded on the north by Camarines, on the east by the Pacific Ocean, on the south by Sorsogon and the Mindoro Sea, and on the west by the Mindoro Sea and Ambos Camarines. The country is rugged and volcanic. A chain of mountains traverses the province from east to west, the majestic volcano of Mayon or Albay rising not far from the eastern coast of the Bay of Albay. It is situated about 20 miles from the sea. From the mountains arise numberless rivers which fertilize the valleys and plains.

AREA AND INHABITANTS.

The area of this province, including the island of Catanduanes and those contiguous to Luzon, is 4,123 kilometers. There are 195,129 inhabitants, the great majority being Vicols.

TOWNS.

The capital, Albay, situated on the bay of the same name not far from Mayon volcano, has a population of 10,600. It has fine houses, with a church, town hall, parochial residence, and other well-con-

structed public buildings. On the eastern coast the towns of most importance, beginning at the north, are: Tivi, noted for its springs, has a population of 10,447; Malinao, to the south of the great Bay of Lagonoy and to the southeast of Tivi, with a population of 11,849. Tobaco, to the southeast of Malinao, with a population of 18,000, is situated on the bay of the same name. It is a much used port, and has on its shores the towns of Malilipot, with a population of 5,858, and Bagacay, with a population of 11,379. On the northern coast of the Bay of Albay is Libog, with a population of 5,751. It is just south of the port called Sula and is very well protected. Legaspi, to the northeast of Albay, with a population of 6,830, is also a much frequented port. Manito, on the eastern coast of the Bay of Paliqui, has a population of 2,369. Near the boundary of Ambos Camarines are the ports of Libong, with a population of 5,449; Polangui, with 10,047; Ligao, to the southeast of Polangui and farther in the interior, has a population of 17,900. Between Ligao and Polangui is the important town of Oas, with 15,987 inhabitants. Guinobatan, to the southeast of Ligao and to the west of Legaspi, with 20,414; Cagsaua, just to the west of Albay, 22,000; Camalig, west of Cagsaua, 15,853. There is a total of 23 towns and 260 villages.

LANGUAGES.

Vicol is spoken almost exclusively.

PRODUCTS, INDUSTRY, COMMERCE, AND WAYS OF COMMUNICATION.

A great advance has been made by this province on account of its richness in hemp, which is cultivated here in a special manner. The value of the annual product is about $4,750,217. The ordinary fruits of the country are produced here. The industries are the production of cloth from abaca and oil from the cocoanut. The principal part of the commerce consists in the exportation of the hemp fiber, there being 370,400 piculs exported, whose value is about $3,700,000, this having risen within a few years from a value of $2,000,000. A considerable amount of sinamay cloth is made here, and there are besides other industries of minor importance. There are several shipyards, which manufacture small coasting vessels, and where a large amount of the valuable woods produced by the forests is utilized. There are besides some coal mines and gold, silver, and iron mines in operation, and some abandoned quicksilver mines. The principal ways of communication are by the carriage roads which extend from Albay to all of the important towns of the province. There are four telegraph stations.

ADJACENT ISLANDS.

Speaking of the configuration of the Island of Luzon in the first chapter, we indicated certain islands adjacent to the coast of this great island; we will now speak briefly of some of the principal ones of these situated to the east of the bays of Albay and Tobaco:

ISLAND OF RAPURAPU.

This is an island of considerable elevation, and triangular in shape. The village of Santo Florentina is located about the center of the south coast, and is the only town on the island. Coal is found here.

REPAIRING A CASCO

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BATAN ISLAND.

This island, like Rapurapu, is about 2 miles wide at its broadest part. The only important town which is worth naming is Batan, on the western coast. There are several coal mines here.

CACNARY ISLAND.

This island, situated to the west of Batan, is very similar to the two already described. There is no town of importance.

ISLAND OF SAN MIGUEL.

This is the smallest of the named islands, situated to the east of Tobaco, and is surrounded by reefs, like all the rest.

PROVINCE OR DISTRICT OF THE ISLAND OF CATANDUANES.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

This island, situated to the east of the peninsula of Ambos Camarines, extends from north to south, and is surrounded by the waters of the Pacific Ocean. On the west is the channel or strait of Maqueda, which separates it from Luzon. The soil is very much broken and mountainous and very fertile, being watered by many small rivers. From east to west in its greatest breadth it measures about 40 kilometers and from north to south about 70 kilometers.

AREA AND INHABITANTS.

Its area is 1,676 square kilometers, and its population 33,310, the greater part of whom present many points in common with the Visayas, according to the testimony of the first missionaries who converted them to the Christian faith.

TOWNS.

The capital is Virac, situated on the south coast of the Bay of Cabagas, which has a population of 6,843. Calolbon, also on the south coast, has a population of 4,201. Pandan, in the extreme north of the island, has 2,500 inhabitants. Payo, to the south of the bay called "The South Anchorage," and Biga, near Payo, have together a population of some 3,252. There is a total of 29 towns and 10 established hamlets.

LANGUAGES.

Vicol is spoken.

PRODUCTS AND WAYS OF COMMUNICATION.

The principal products are rice, corn, hemp, indigo, cocoanuts, and fine building woods. The natives wash a considerable amount of gold from the sands of the rivers. There is communication between the towns of Virac and Cololbon with Bato.

ADJACENT ISLANDS.

The most important of these are Panay, in the Bay of Payo; Biga and Tambongon, to the north; also Balumbanes, with the small group of islands. In the front of Carao, toward the north, there is a small island of little importance.

PROVINCE OF SORSOGON.

BOUNDARIES AND GENERAL CONDITIONS OF THE COUNTRY.

The new province of Sorsogon is situated in the southeastern extremity of the island of Luzon, and is bounded on the north by the province of Albay and the Pacific Ocean, on the south by the Strait of San Bernardino, on the east by the Pacific Ocean and the Oton or interior sea of the archpielago. The character of the country is similar to that in the province of Albay. The most southern part forms a peninsula, from the center of which rises the volcano of Bulusan, which is the origin of many small mountain ranges, which form the sources of the rivers which water the extensive and fertile valleys.

AREA AND INHABITANTS.

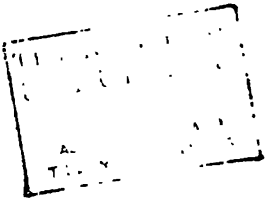
Ther area is 1,954 square kilometers the population 98,650, almost all of the Vicol race.

TOWNS.

Sorsogon is the capital of this new province. The port of Sorsogon is the best of all those found between the Strait of Verdi Islands and that of San Bernardino, and is suitable for all kinds of ships. It is an excellent refuge for ships which in the Marinduque Sea have been surprised by squalls or typhoons, which usually pass to the north of the Strait of Ticao, and for ships which have been damaged in passing through the Strait of San Bernardino. The entrance to the bay lying between Point Bantique on the west and that of Bagatao on the east contains the islands of Bagatao and Malamahuan, which divide it into three channels, the one between the two islands, being the principal one, and the only practicable one for all kinds of ships. That which is called the Boco-chica, to the east of the island of Bagatao, is very narrow, having a rock located on the southern side, and to pass this even with small steam launches it is necessary to run very close to the shore of Bagatao, which is clear and with a depth of from 13 to 15 meters of water, this not being true of the opposite side. The channel found between the island of Luzon and Malamahuan, although having a depth of from 5 to 8 meters, is very narrow, and still worse than the one already mentioned. The coast and islands on the other side are clear, and the islands which appear on the north abrupt, especially on the outer side, so that navigation through the middle of the channel is free from all danger.

The Bay of Sorsogon, which is entered after passing the entrance, is spacious and 19 miles in width from the east-northeast to the vicinity of the town of Sorsogon. Soundings diminish progressively from 17 to 5 meters, the bottom being muddy. To the the north of this bay

GOVERNMENT BOATS.



there is a fine gulf, having a depth of 7½ meters, with muddy bottom all over. The coast of Casiguran, to the south of Sorsogon, is notable for the malformation, which is seen, according to the best data obtainable, for a long while. It has sunk about eighty-four one-hundredths of a meter annually. The population is 10,700.

Around the Bay of Sorsogon are situated Tuban, with 5,555 inhabitants; Catilla, with 2,069; Magallanes, at the entrance of the bay, with 2,928; Pilar, or Port Putiao, on the western coast, with a population of 9,127; Donsol, near to the boundaries of Albay, with 4,682; Bulan, near the southern part of the peninsula, with 5,545; Matnog, on the Pacific coast, with 2,320; Bulusan, with 5,413; Barcelona, with 4,947, and Cubat, one of the finest towns of the province, with 12,590. There is a total of 16 towns, 131 villages, and numerous hamlets.

LANGUAGES.

The language is Vicol.

PRODUCTS, INDUSTRY, COMMERCE, AND WAYS OF COMMUNICATION.

The principal products, apart from building woods, which are found in the mountains, are hemp and copra, both articles of exportation. The industries are in about the same condition as in the province of Albay. There are various mines, not worked. The principal towns are connected by cart roads and paths; one leads to Labay from Pilar.

ADJACENT ISLANDS.

The islands near to the coast of this province are of little importance. Several are seen to the southeast of the central part of the province north of the Strait of San Bernardino. The others are enumerated and described in Chapter I.

CHAPTER VI.

THE ISLANDS ADJACENT TO LUZON.

[Maps Nos. 13, 15, and 17, of the Atlas of the Philippines.]

THE BATANES GROUP.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

To the north of Luzon and south-southeast of Formosa are the two groups of islands called the Batanes and the Babuyanes, the latter nearest to the north of Luzon.

BATANES.

The most important islands of this group are Basay or Batan, Saptan, and Itbayat. The northern islands near Formosa, called Jamia and Norte, terminate the group. There are other islands of little importance, or uninhabited, such as Siayan, Diogo, Misanga, Dequez, Mabudis, and Diamis, or the Diami rocks.

BABUYANES.

The second group consists of the islands of Calayan, the largest of all, the name which has been given to the group on account of the abundance of hogs (babuyes in Tagalog meaning hogs).

Other islands of fair size are Camiguin, Dalupiri, Fuga, and Font. Those farthest distant from Luzon are the two called Balingtan, which give name to the channel, which is between the Babuyanes and the island of Saptan, the most southern of the Batanes. Some authors include Balington with the Batanes.

ISLAND OF BASAY OR BATAN.

The most important of the Batanes measures 20 kilometers from north to south and 4 kilometers from east to west. In the northern part rises Mount Irada, which seems to be volcanic. The country is mountainous, but has large cultivated plains.

SAPTAN ISLAND.

At about 6 kilometers to the southwest of Basay rises the island of Saptan, which has an area of about half that of the preceding island. It has the same general conditions of country.

ISLAND OF ITBAYAT.

This island is situated to the northwest of Basay at a distance of about 20 miles; it is a very fertile island, and the largest of the Batanes, almost a half larger than Basay.

ISLAND OF DALUPIRI.

This is the most western of the Babuyanes Islands, and is situated about 25 miles northeast of Point Cabicungan, of Luzon. It is regular in aspect and about 8 miles long.

FUGA ISLAND.

This island is situated 9 miles to the south-southeast of Dalupiri, is also flatter than that island, and extends from east to west a distance of 10½ miles. This island is known on account of the port of Musa, situated on the western side.

ISLAND OF CALAYAN.

This island is situated 13 miles to the east of Dalupiri, and is larger and of greater elevation than the island of Fuga. It is composed of mountainous and low lands, and its greatest elevation is in the center of the island. It is cut in certain places by deep valleys. It extends from east to west a distance of about 10 miles. There is a fair bay on the south coast.

THE BABUYANES OR ILARO ISLANDS.

BABUYAN.

This island lies farthest to the northeast, and is the highest of all the group. It is situated about 25 miles east-northeast from Calayan. There is a volcano situated at the western extremity of the island.

CAMIGUIN ISLAND.

This island is very mountainous and high, especially on the northeast. It is about 12 miles long from north-northeast to south-southwest, and is situated about 32 miles south one-fourth southwest of Claro Babuyan. It is known on account of the volcano, called Camiguin. Seven and a half miles to the east, one-fourth southeast of the northeastern point of Camiguin, arise the two rocks called Guinapac. They present the appearance of two towers, and are surrounded by various little islands. To the northeast of these rocks are four others called Didicas, more elevated than the preceding and surrounded by various smaller rocks, and a little island about 60 meters in height, and less than a mile in circumference, forms a group with these rocks. On the northern coast there is an active volcano.

FONT ISLAND.

This island has a diameter of 1½ miles; it is high and very rugged on the west, and uninhabited the greater part of the year.

TOWNS.

The towns of greatest importance in the Batanes are Santo Domingo de Baseo, the head town, with a population of 2,652. It is situated at the foot of Mount Irraya, and is surrounded by the best land in the Batanes, this being level and picturesque. It contains some fine buildings. The port is excellent and very safe, except during the west monsoon. To the south of Santo Domingo, about 5 kilometers distant, is Magatao, a town of 1,195 inhabitants; it has the best church in the Batanes, and a port suitable for small vessels. At a distance of 2 kilometers from this town is Ibana, with a population of 1,914; San Vincente, with a population of 1,935, is the only town on the island of Saptan, although the entire island is bordered with little villages. Maya, the only town of Itbayat, with a population of 1,080, is situated on most fertile ground, and not far from forests containing excellent woods for furniture making, but of little value for building purposes.

In the Babuyanes the principal towns are Musa, on the island of Juga, and Calayan, on the island of the same name, situated near to the east of the center of the coast, and which has a population of 584. On Camiguin Island there are several small hamlets.

LANGUAGES.

The native inhabitants speak their own language, Batan, which must not be confounded with Ibanag, although it is somewhat similar to it.

PRODUCTS, COMMERCE, INDUSTRY, AND WAYS OF COMMUNICATION.

The Batanes, with the exception of Itbayat, are lacking in building woods; on the other hand, there is an abundance of lime, sand, and stone for building materials. The principal products are ube, sweet potatoes, corn, a little rice, and some sugar cane, which is used for the manufacture of the wine known as "palec." There is not a great variety of fruits, although the pineapples of Batanes are so fine that they are superior in size and quality to those produced in other parts of the archipelago. Potatoes, rice, and vegetables found in Spain grow well here. The principal industry is grazing, which assumes large proportions. Goats, horses, and hogs are raised and exported in large numbers. There is a large exportation of lard. In the vicinity of the towns are large cocoanut groves, especially near to Itbayat, the oil being exported to Manila.

Communication between the various islands is most difficult on account of the strong currents in the channels and the lack of anchorages. Communication with the rest of the archipelago is still more difficult.

THE VASCHI ISLANDS.

These constitute a little group of islands to the north. They are very small in size and are truly isles. The principal ones, commencing with those nearest to the Batanes, are Siayam, Mabudis Tanem, Maysanga, and Jami. All of these islands, with the exception of the last, are within sight of the Batanes. The most important of them is Jami, inhabited, according to the Batanes, by savages and pagans of

the Vaschi race. It is not known whether the language spoken is derived from the Batan language or is peculiar to the inhabitants. In the northwest the inhabitants of the Batanes and of the Vaschi Islands understand each other, perhaps on account of certain words in common. No Spanish officer or missionary has ever visited these islands.[1]

ISLAND OF MINDORO AND ADJACENT ISLANDS.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

This island is the sixth in size of the islands of the Philippine Archipelago. It is situated to the south of Luzon. On the western coast it is bounded by the China Sea, forming, with the Calamianes, the strait of Mindoro, which is divided into two channels by the Apo banks; toward the north it is separated from the coast of Luzon by the Isla Verdi Strait, and is bounded on the east by the Visayas Sea, and on the south by the sea of Mindoro. The country is mountainous and the vegetation exuberant. It produces excellent building woods and contains also copper mines and sulphur. It is the least exploited in the interior of all the islands.

AREA AND INHABITANTS.

The area, including the adjacent islands, is 10,167 kilometers. There are 67,656 registered inhabitants, including unconquered pagans, who inhabit the interior, whose population would, without doubt, exceed 106,200. The principal race inhabiting the interior is the Manginanes, whose customs are very savage and primitive. Some suppose that the Manguianes are only those pagans who dwell in the mountains near Mangarin, and that the rest of the inhabitants of the interior belong to the Bangot, Buguil, Tadianan, Durugmunan Beribi, Buctulan, Tiron, and Lactan tribes. There are some authors, among them Blumentritt, who believe that Negritos live in the vicinity of Halcon.

TOWNS.

The capital town is Calapan, situated on the north coast, on the little peninsula, and has a population of 5,953. On the same coast is Puerto Galera, which is famous on account of its safe harbor, and has a population of 1,700. Naujan has a population of 5,200; Pola, on the western coast, northeast of Mangarin and Tabayan, is situated at the head of a magnificent bay, and has a population of 2,000; Mamburao and Paluan, on the western coast, toward the northwest of the islands, are also towns of importance. All the towns in the island are situated near the coast.

LANGUAGES.

Tagalog is spoken in the northern part, Visayan in the southern, and Manguian in the central part of the island.

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[1] The greater part of the data in reference to the Batanes and Vaschi islands is taken from a letter from Father Anastasio Idigoras, O. P., published in Nos. 138, 139, 140, 141, and 142 of the "Policy of Spain in the Philippines."

PRODUCTS, INDUSTRY, COMMERCE, AND WAYS OF COMMUNICATION.

The immense forests of this island contain all kinds of woods, palms, and bamboos, although but little profit is derived from them on account of the lack of people to work them. Among the trees found may be mentioned calinga, a species of cinnamon. Near the principal towns woodcutting is carried on in the adjacent forests, and during the last few years a considerable quantity of wood has been exported to Manila. Most of the wood is cut near the towns of Paluan, Mamburao, Itirum, Bulalacao, Pola, Pinamalayan, Naujan, and the capital; and the traffic is carried on by a small number of ships running to Manila and Batangas. The town of Pola has extensive nipa groves, whose products are exported to the provinces of Batangas, Tayabas, and the island of Marinduque. Rattan, diliman, rajas, buri, and wax, which is obtained from the towns of Puerto Galera, Paluan, and Mamburao; tortoise shell, which is obtained from the little bordering islands; large canoes, made from a single piece of wood, which are constructed in the towns of Baco and Sabuaan; sibucao, which is exported from Puerto Galera; balao oil, pitch, nigui, and cabonegro are the principal articles of export. The cultivation of hemp is increasing rapidly, although at the present time but little is gathered; and within the last few years some attention has been given to the cultivation of sugar cane in the vicinity of Calapan. Abra de Ilog and Mamburao have given good results in the cultivation of this article, as last year 1,200 piculs were exported. The cultivation of tobacco, long established in the towns of Sablayan and Santa Cruz, produces a good quality similar to that of the Igorrotes. Cotton is quite abundantly produced, but is utilized only by the natives themselves, no exportation taking place, except to the island of Iting. Grazing in Mindoro is scarcely worthy of mention, except that it exists in the towns of Abra de Ilog, Naujan, and Mangarin. The live stock raised is used only for home consumption, perhaps on account of lack of suitable ships for exportation.

There is found in the forests of Mindoro an indigenous animal called the tamarao—a species of buffalo or carabao, but smaller and very ferocious. Its horns are straight and not semilunar, as in the carabao. It is hunted with lassoes and lances, and in the attack a thrust is made for the eyes or the chest. But any method of hunting this animal is very dangerous, and the natives do not expose themselves to it, except when it is necessary to protect their crops.

Of the mineral products of this island nothing is known except in regard to sulphur, which is found in large quantities in the town of Subaan, and gypsum, which is found at Naujan, and flint, which is exported from Bacó.

The ways of communication are almost all by sea, and are dangerous, although it is possible to go by land from the head town to the towns on the eastern coast of the island. It is preferable, however, to go by sea, as the rugged character of the country and the many rivers, which are crossed only with danger on account of the crocodiles, and the mountains make the journey by land exceedingly difficult. The towns of the north and west can communicate with the capital only by sea, as no roads by land exist on account of the rugged mountain chains between Puerto Galera and Subaan.

ISLANDS ADJACENT TO MINDORO.

The principal islands adjacent to Mindoro are, on the northwest, the Lubang group; on the northeast, the Maranduque group; on the southwest, the Iling group; and, on the south, the Semaraza group.

LUBANG GROUP.

The island of Lubang is the largest, most important, and only inhabited one of this group. It is 16 miles in length from northwest to southeast and 4 miles in breadth, and has many indentations on the coast, among them the safe harbor of Tilig and several bays more or less protected. The land in the interior as far north as the parallel of Tilig is low and level, and from this point south broken and mountainous, the highest mountain being near Gontin, on the western coast, south-southeast of the town of Lubang.

LUBANG.

This town, situated on the northern coast 2 miles from Point Sala, has a population of 6,516. The inhabitants are mostly Tagalogs, engaged in agricultural pursuits, hunting, and fishing. During certain seasons of the year a large number of turtles' eggs and eggs of the brush turkey are found along the shores. These are used as food by the natives. The other islands of the group are Ambil, to the east of Lubang; the Talinas islands, to the south of the bay of Loog, on the southeastern part of the island; Mandani, a mile to the north of Ambil; Malabatuan, a little island also to the north of Ambil; Cabra, the most western of the group, having a length of 2 miles from northwest to southeast, where a light-house of the first class is situated, and Golo, the most eastern island.

MARINDUQUE GROUP.

The principal island is Marinduque, situated to the northeast of Mindoro and south of Luzon. It is almost circular in shape, 25 miles in diameter, mountainous, and quite high, having a range on its eastern side, which runs from north to south, formed by the Tapian, San Antonio, and Marlanga mountains. The land is fertile, although watered by small rivers only. The principal product of the island is rice. There are two ports, San Andreas on the northwest, and Santa Cruz on the northeast, and a few bays on the southeastern and western coasts, which offer fairly safe anchorages, according to the prevailing monsoon and the condition of the sea.

The most important towns are Boac, with a population of 15,000, and Santa Cruz de Napo, with a population of 15,600. Large quantities of rice are exported. The inhabitants are almost all Tagalogs.

The principal of the adjacent islands are the group Tres Reyes to the southwest of Mompog, Maninayan to the northeast, and San Andreas and some smaller islands to the northwest.

ILING GROUP.

Iling, the principal island of the group, has a length of 10 miles from the northwest to the southeast, and is shaped like an elongated triangle. The land is high and mountainous. All of the eastern coast

is high and covered with trees and extensive mangrove swamps, which reach to the shore, except at the point on the southeast just opposite a rough and jagged rock. The only town, called Iling, has a population of 500 Tagalogs and Visayans engaged in fishing. Their food is mostly fish, turtle, and bolate (sea cucumbers).

Just in front of the middle of the eastern coast is the island of Ambolan, which is of medium height and surrounded with reefs.

SEMERARA ISLANDS.

These islands include the islands of Semerara, Nagubat, Libagao, Sibolon, Sibaton, Caluya, Sibay, and Panagatan. Semerara, situated 8 miles southeast of Point Burancan, southern extremity of Mindoro, is 8½ miles in length from north-northwest to south-southeast and 4½ miles wide on the south, its point of greatest breadth. The island is mountainous, but of medium height, and has irregular coasts. It has one town or village situated in the northeastern part, inhabited by 150 people, who are engaged in collecting the sea cucumbers from the shallows which surround the bay. The channel between this island and Mindoro is free from rocks, and deep, according to the testimony of Captain Villavicincio, who was chief of the hydrographic commission of the Philippines. Coal is found in these islands near the shore at a depth of 1 foot. In the northern part it is of good quality; in the southern part of but medium grade.

NABUGAT.

This is a small island situated a mile northeast of Semerara, and is of medium height.

CALUYA.

This island is 8½ miles to the east of Semerara, and 4 miles long from north to south and 1½ miles broad. The southern part is quite elevated, reaching a height of 190 meters above the sea level.

SIBOLON.

The island of Sibolon is 10½ miles east of Semerara and 6 miles north of Sibato and is surrounded by reefs.

SIBAY.

Sibay, 7½ miles to the southeast of Semerara and 2½ miles from Caluya, is a small island 65 meters in height.

THE PANGANTAN ISLANDS.

These are little isles and reefs south-southwest of Semerara and 7 miles from Cebu. The channel between the most eastern islands of this group, Semerara, and the northwestern extremity of Panay is 19 miles wide and very deep.

ISLAND OF BURIAS.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

This island forms a comandancia. It is narrow and long, extending from north-northwest to south-southeast, and is situated in the strait which separates Masbate from Ambos Camarines. To the north and

northeast is the island of Luzon and to the southeast the island of Ticao. The interior is mountainous and craggy, and from the center rises Mount Engañoso. A mountain range traverses the island from northwest to southeast. Toward the southwest is the little island of Gorion, which seems to be a continuation of this mountain range. On the northeastern and western coasts there are some level lands which are under cultivation.

AREA AND INHABITANTS.

The island has an area of 292 square kilometers, and a population of 1,703, almost all Vicols. At the beginning of the century this island was inhabited by Moros.

TOWN.

The only town is San Pascual, on the northwestern extremity of the island. It has a port fronting the little island of Busin, and is surrounded by a multitude of islands and shoals, forming narrow channels. It has, together with the village of Claveria, a population of 1,600, who, with the few others in the five little villages not far distant, constitute the total population of the island.

PRODUCTS, INDUSTRY, AND COMMERCE.

The extensive forests of this island produce fine building woods, but on account of the difficulty of getting them out they are not worked. Tobacco is produced in small quantities; also hemp, sugar cane, chocolate, rice, and cocoanuts. There is an abundance of live stock, which is exported to Manila. The only industry is the manufacture of bayones, sugar sacks of buri, a palm which is very abundant in the forest, and which has given its name to the island.

THE ISLANDS OF MASBATE AND TICAO.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

The island of Masbate is bounded on the north by the Strait of San Bernardino and by the seas which bathe the shores of Burias, Cebu, Panay, and Romblon. It extends from northwest to southeast for a distance of 72 miles, and is triangular in shape. It is very mountainous, there being a high central chain which follows a semicircular direction and terminates in the southwestern and southeastern points of the island, throwing out spurs to the northwest, which go to form Point Bugni. Other points of less importance are likewise formed by spurs from this chain.

TICAO

Is 24 miles in length from northwest to southeast and 4 miles wide. It is situated to the west of the coast of Albay. The land is covered with vegetation and is very fertile. Its principal ports, although none of them are good, are San Miguel and San Jacinto. Ticao divides the channel of the same name into two channels—that on the west, formed with Masbate, 65 miles wide in its narrowest point, and that on the west of Luzon, which is 8½ miles wide and is most frequented by ships.

AREA AND INHABITANTS.

Masbate and Ticao have an area of 3,897 square kilometers, and 21,366 registered inhabitants. Those in the central part are Vicols and those in the south Visayans.

TOWNS.

Palanoc, situated on the bay of the same name, is the capital; it has a population of 2,900. Baleno, on the eastern coast, 3 miles northwest of the port of Magdalena, has a population of 2,500. On the bays of Uson and Nara there are towns of medium size, as well as on the bay or port of Calingan on the eastern coast. Milagros is another small town, having a population of 3,441. There are but few inhabitants on the south and west of the island.

In Ticao the principal town is San Jacinto, on the port of the same name; it has a population of 2,824, and is a fairly good port.

LANGUAGES.

Although the population is fairly homogeneous, the same can not be said of the language. Vicol, Tagolog, and Visaya are spoken, according to the distances of the towns from the mother provinces of these dialects. Thus, in Baleno and Luang, Tagalog is spoken by preference; in Ticao and Uson, Vicol; and in Palanac, Calingan and Milagros Visaya.

PRODUCTS, INDUSTRY, AND COMMERCE.

The agricultural products, although in general like those of the rest of the archipelago, are very few; this being especially true of rice, which has to be imported, sugar cane, cotton, chocolate, and hemp. In Magdalena, Masbate, Calingan, and San Jacinto tobacco is produced; in quality it is very strong, and, though much valued by the Vicols, brings but a low price in Manila. One of the chief sources of wealth is grazing, which has increased greatly during the last few years. Industry is limited to the gathering of forest products, to fisheries, hunting, weaving, and the manufacture of palm mats, which, on account of the excellence of the work and the durability of the colors, have attracted attention from European expositions. Commerce is limited to the exportation of agricultural and forest products and cattle, and the importation of rice and groceries from Europe. The natives collect some gold from the sands in the rivers.

ADJACENT ISLANDS.

San Miguel and Mataban are, respectively, northwest and southeast of Ticao. There is a small island in the port of Barrera, in the north of Masbate; also the island of Deagais, in the Bay of Nara; the island of Bugton, in the port of Calaingan; the island of Nara, at the entrance of the bay of the same name; Asid, to the south of Masbate; the Zapato and Imtotolo Islands, to the southwest of Point Pulanduta. On the western coast are the islands of the Bay of Nin, Mapayagnan, and Majaba.

CALAMIANES AND CUYOS ISLANDS.

The Calamianes and Cuyos islands are usually grouped by authors under the name of "Calamianes." According to this, the Calamianes include a group of more than 100 islands, situated between Paragua on the southeast, Mindoro on the north, Panay on the east, and the Mindoro Sea on the south. All of these islands are, in general, mountainous and rugged and covered with vegetation.

AREA AND INHABITANTS.

The total area of these groups is 1,600 square miles, and the total number of registered inhabitants 14,291. They are for the most part Visayans and the Calamianes, or Tagbanuas. The mountains of the large islands of Calimian and Busuanga are inhabited by pagans, probably of the Negrito race. The island of Agutaya, in the Cuyos group, is inhabited by the Agutainos, a special Malayan race.

ISLANDS AND TOWNS.

The principal islands are: Calibangbagan, situated 8 miles east of the northern point of Paragua; it is 2½ miles long from northwest to southeast.

LINACAPAN.

This is the largest of the numerous group, situated between the northeast coast of Paragua and the island of Calimian, at a distance of 12 miles from the latter; it is 10 miles in length from north to south, and its north coast forms two deep bays. On the eastern side are seen various bold conical-formed points. In an angle to the southwest there is the little town of San Nicolas.

CABULUAN ISLANDS.

This is a little group situated to the southeast, 14 miles from the point northeast of Linacapan. It is composed of two large islands and a number of small islands and rocks.

NONGALAO,

To the northeast of Cabualauan, is of medium height and is formed of a central hill.

MALUBUTGLUBUT

Is situated 10 miles to the east northeast of the island of Culili and is the most northwestern of the Linacapan Islands.

NANGA ISLAND

Is situated between the islands of Malubut and Calibangbagan.

BUSUANGA.

the largest one of the Calamianes Group, is about 34 miles long from northwest, one-fourth west to southeast, one-fourth east, and is 18 miles wide in its broadest part. It is very irregular in shape, and its coasts are indented by numerous deep gulfs and bays. Its northeast coast, with the multitude of little islands near it, forms the west coast of the channel west of Apo. The island is mountainous, little populated, and little cultivated, although its soil is fertile and suitable for the cultivation of the usual products of the archipelago, but its inhabitants, almost all united in the town of Busuanga, occupy themselves principally in gathering sea cucumbers and collecting nests of salanganes.[1]

USON.

This island is situated at the western entrance of the strait of Coron and extends from east to west a distance of 4 miles, being 1½ miles broad at its widest part. It is surrounded by little islands and reefs.

PEÑON DE CORON.

This island is situated to the southwest of Busuanga; it is very high, rocky, and without vegetation. It measures 11 miles from north to south and 4½ miles from east to west.

CULION.

This island, also called Calamian, is situated southwest of Busuanga, from which it is separated by a channel 3 or 4 miles wide. The chief town is Culion, situated on the northeast coast, on a point north of a good port, and has a population of 2,100. The soil is very fertile, but the inhabitants cultivate it but little, raising only a small amount of rice and occupying themselves almost exclusively in gathering sea cucumbers, birds' nests, and wax, which latter is of superior quality. All of the islands of the Calamianes Group abound in reptiles, deer, wild hogs, and birds, which destroy the crops. The bamboo of this island is of a special kind.

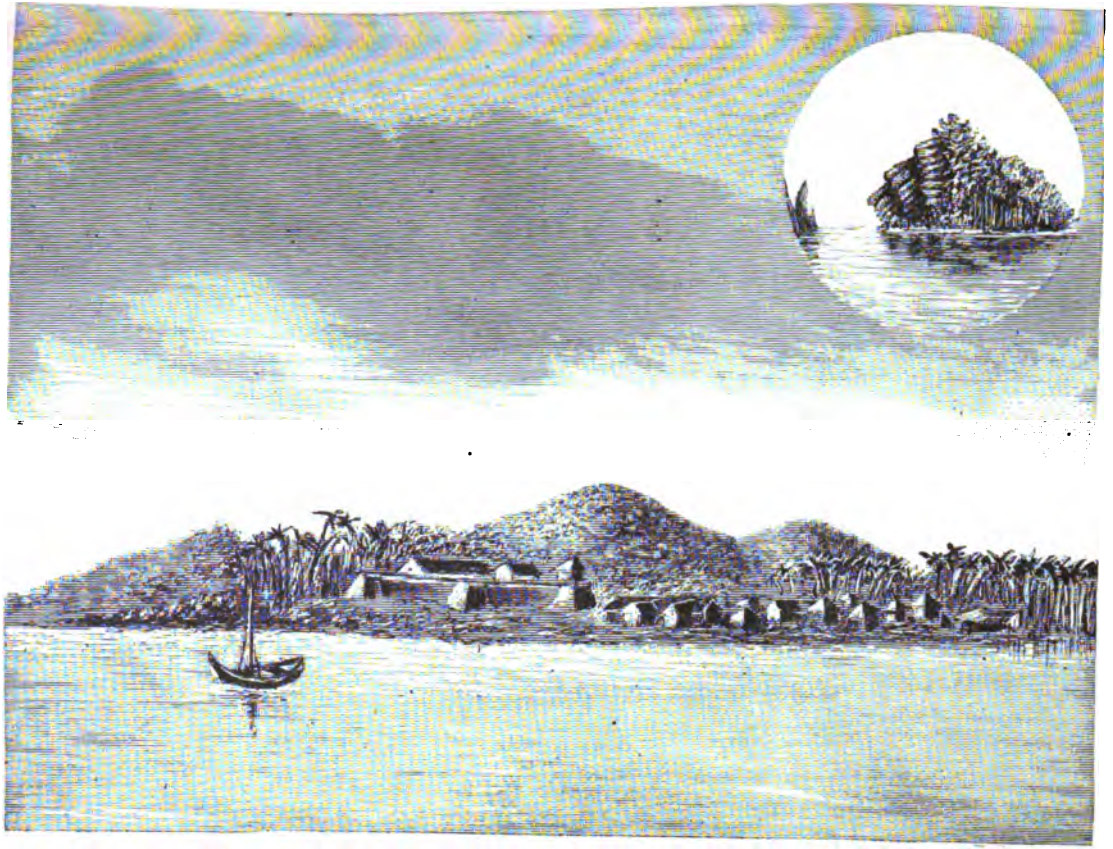
CUYOS ISLANDS.

These islands are situated to the south of Mindoro, halfway between the west coast of Panay and the northeast coast of Paragua. They form a group composed of a multitude of high and rocky islands and isles which occupy a sea space approximately circular and 45 miles in diameter.

CUYO.

This island is also called "Gran Cuyo;" it extends from northeast to southwest a distance of 7½ miles, being 4 miles in breadth; a little mountain chain divides it longitudinally. On the western coast is situated the town of Cuyo, the capital of all the Calamianes, considered politically. It has a population of 6,300. These people are occupied principally in the collecting of sea cucumbers, turtles, and pearls, and

[1] Some details concerning these nests may be found in the article on zoology.



ISLAND OF CUYO.

the gathering of birds' nests in the islands of Paragua and Culion, where they are ordinarily found in the greatest abundance; they also raise hogs and various kinds of fowls.

CAMPO

is situated 6½ miles northwest of the island of Cuyo, and is small, clean, and precipitous, and formed of a central mountain. Near by, to the northeast of Cuyo, are the little islands of Siparay Tuebuque, and the isles of Tayanayan and Cocoro, these two being almost united.

AGUTAYA.

This island is situated almost in the center of the group, and is 3 miles long from north to south; it is bold and precipitous on all sides except the southwest, and is surrounded by various small islands, such as Dit on the north-northwest, Maracanao on the northeast, Matazabis to the east-southeast, Guinlabo, Paya, Patunga, Pamitinan, and Lubic on the southwest, Oco, Imaranan, and Sean on the west. The town of Agutaya has a population of 2,064 inhabitants.

LANGUAGES.

Calamian, Vicol, and Visaya are spoken, the latter especially on the Cuyos Islands, which are nearest to Panay. After Calamian and Tagbanua, it is the language most generally spoken in the Calamianes. In the island of Agutaya a special dialect called Agutiano is spoken. Coyuno is spoken in the islands nearest to Paragua.

PRODUCTS.

These have already been indicated in speaking of the towns. In general, it may be said that the inhabitants of these islands are occupied more in fishing and hunting than in agriculture. They cultivate the land only for the production of articles of food of prime necessity which are used in the islands themselves. They export bamboo, wax, and, during the past few years, chocolate, the cultivation of which is increasing, and some cattle. The industries are limited to the manufacture of wine and cloth, especially that made from hemp. In some of the islands gold is found.

CHAPTER VII.

VISAYAS (A).

ISLANDS OF ROMBLON AND PANAY.

[Maps Nos. 16 and 20 of the Atlas of the Philippines.]

INTRODUCTION.

The Visayan Islands, formerly called Islas de Pintados (islands of the painted men), occupy the central part of the archipelago, between Luzon on the north, Mindoro on the south, the Pacific on the east, and Paragua on the west. They are situated between 9° 2′ and 12° 39′ north latitude, and between 121° 48′ and 125° 50′ west longitude from Greenwich.

The total area of the Visayas is 57,714 square kilometers, and the number of inhabitants 2,202,565. The group may be divided into three parts, which will be treated of in three chapters, as follows: First, Romblon and Panay; second, Negros, Cebu, and Bohol; third, Samar and Leyte.

Something will be said of the islands adjacent to the principal islands as these are spoken of.

ROMBLON GROUP.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

The Romblon group includes the islands of Romblon, Bantan, Maestre de Campo, Sibuyan, Simara, Tablas, and the small adjoining islands. On the north are Marinduque, Luzon, and Burias; on the south Panay, on the east Masbate, and on the west Mindoro. They are situated between the parallels of 12° 3′ and 13° 14′ north latitude, and 121° 34′ and 122° 50′ east longitude from Greenwich.

AREA.

They have an area of 1,278 square kilometers, and a population of 34,828, the greater part of whom are Visayans. In the island of Tablas there are some pagans of the Negrito race, and in the same island and in Romblon some Manguianes.

ISLANDS AND TOWNS.

The most northern group is formed of the islands of Maestre de Campo, Banton, Bantoncillo, and Simara, which form, with the coasts of Mindoro on the west, Marinduque on the north, and Tablas on the south, very deep and clear channels. These are well-known and much frequented by Philippine boats, which pass through the Strait of Isla Verde on their way from Manila to Iloilo, Negros, Cebu, and the southern part of the archipelago.

MAESTRE DE CAMPO.

This island is situated 11 miles southeast of the nearest land; the elevated hill formed by Mount Dumali in Mindoro. It is circular in form, 3½ miles in diameter and very mountainous and high. The principal anchorages are Concepcion and Sibali on the southern coast of the island.

DOS HERMANAS

are two small, level islands, 42 meters in height and very close together, situated 5 miles northeast one-quarter east of Maestre de Campo; the western one is called Carlota.

BANTON.

This island is situated 18 miles east of Maestre de Campo and 7 miles to the southeast of the island called Isabel, to the east of Dos Hermanas. It is about 4 miles from north to south, and the same from east to west; it is high and precipitous, except on the southern side, where there is a small rocky reef. On the eastern coast there is a small bay, where the town of Banton is situated. The soil of the entire island is quite sterile. The town has a population of 4,063. A small quantity of tobacco, of poor quality, is produced here. There is a mine of gypsum of excellent quality and another of almager of very poor quality.

BANTONCILLO,

a little island situated to the southwest of Banton, is very narrow and about three-quarters of a mile long, from north to south.

SIMARA.

This island is situated approximately in the middle of the channel between Banton and the north of Tablas. There is one small town called Corcuera, which has a population of 2,064.

TABLAS.

This long, narrow island, extending from north to south, between the little group of Banton and Bantoncillo on the north, and the northwestern extremity of the island of Panay on the south, separates the channel southeast of Mindoro called Tablazo from that of Capiz, which will be spoken of later. It is 35 miles long, from north to south, and about 10 miles wide in its broadest part. The country is mountainous, in the extreme north there being a mountain called Cabeza de Tablas, 733 meters high, which dominates the entire island. On the southwestern coast there is a town and port of Looc, the best in the island. The town has a population of 6,463. There are three other towns on the island, as follows: Odiongan, on the eastern coast, with a population of 5,651; Badajoz, with 9,461, and Salado, with 2,274.

CARABAO.

This island divides the strait between Panay and Tablas. It is quite mountainous.

ROMBLON.

This island is situated 6 miles to the east of the northeastern part of Tablas; it is 8½ miles long, from north to south, and 4½ miles in its greatest breadth. It is very rich in quartz, marble, and slate. The port of Romblon, in the upper part of the western coast of the island,

although small, is one of the best in the Visayas. In front of the port is the small island of Lubung. On point Sobang there is a lighthouse, as a guide to the entrance of the harbor. At the foot of a high mountain, just at the head of the bay, is the principal town of the island, Romblon, which has a population of 7,263.

ALAD.

This island is situated to the north of Lubung, 7½ cables length from the northwest coast of Romblon.

COBRADOR.

This island is situated a mile north northwest of Alad.

SIBUYAN.

This island is quite mountainous, and almost in the center there arises from among others the peak called "Sibuyan," which dominates the entire island. The island is 17 miles long, from northwest to southeast, and 9½ miles broad, from northeast to southwest. There are three principal rivers. The Mabalog rises on the highest peak of the island on the southwestern side and falls in beautiful cascades into an extensive valley, which, along with several smaller streams, it waters, finally discharging on an extensive sand beach but a short distance to the east of Point Mabalog, from which it takes its name. The Cambulayan has its source on the western side of Sibuyan, winds its way around several mountains which it encounters in its course, and, increasing its volume from several small rivers, empties to the east of the island a short distance to the south of Point Cambulayan. The Nailog has its source on the heights of one of the highest peaks of the northwest. After receiving the waters of several small rivers, it flows through the most extensive valley of the island and empties on the north over a sandy beach, about the center of a bay situated between points Balaring and Pagdulog.

There are, besides, many smaller rivers or creeks, all containing as fine drinking water as is found in the archipelago. The island is extremely fertile, and has beautiful lowlands suitable for the cultivation of different articles, but its inhabitants live in the greatest misery and plant only such things as are absolutely necessary for their existence, being engaged in the collection of sea cucumbers and tortoise shell, and also in the collection of gold from the placer mines of the Nailog River. The Manguianes, who live in the mountains, are quite pacific, but not at all addicted to work and so dirty that the most of them go naked and are covered with all kinds of repugnant cutaneous eruptions. The island has three towns belonging to the district of Romblon—Capdiocan, on the eastern coast, with a population of 3,797; Magallanes, on the northern coast, with 1,744, and Azagra, with 3,798. There are also several villages scattered along the coast. In the interior there are tribes of Manguianes who have never been subjugated. The sea space between Romblon, Sibuyan and its adjacent islands, and Panay is called by seafaring men the Tablazo de Capiz.

LANGUAGES.

Visayo is generally spoken, except by the Manguianes, who use their own language.

PRODUCTS.

In the towns of this group various products are produced sufficient to satisfy the wants of the inhabitants. Some tobacco of rather inferior quality is raised. During the last few years the exportation of copra from Romblon has assumed respectable proportions. A certain amount of gum mastic is exported from Romblon and Sibuyan. The marble quarries of Romblon are also worked to some extent.

THE ISLAND OF PANAY AND ADJACENT ISLANDS.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

The island of Panay, belonging to the Visayan group, is situated between parallels of latitude 11° 55′ and 10° 24′ north, and longitude 121° 49′ and 123° 9′ east from Greenwich. To the north extends the Tablazo de Capiz, or little inland sea, included between the islands of Tablas, Romblon, Sibuyan, and Masbate. As has been said, on the east the Straits of Concepcion and Iloilo separate it from the numerous adjacent islands and the island of Negros, and on the south and west extends the important inland sea known as the Sea of Jolo or of Mindoro, which separates it from Negros, Paragua, the Cagayanes group, and the Cuyos and Calamianes groups. All of the islands and isles adjacent, and some of those farther away, belong to the civil government of the districts into which this island is divided. It may be said, in a general way, that the shape of the island is triangular, the three sides extending from west-northwest to east-southeast, from northeast to southwest, and from northwest to south-southwest. In general the island is mountainous, although there are many extensive and very fertile valleys.

AREA AND INHABITANTS.

The total area, including the adjacent islands, is 13,583 square kilometers; the population, 756,786, the most of whom are Visayans. There are several thousand pagans, called Mundos, dwelling in the mountains, and also some Negritos in some of the mountain chains.

CIVIL DIVISION OF THE ISLAND INTO PROVINCES OR DISTRICTS.

The mountain ranges form natural divisions for the provinces or districts of the island. These are Antique, Capiz, Iloilo, and the comandancia, or district of Concepcion.

PRODUCTS.

The fertility of the soil of Panay is well known. Among the various woods may be mentioned molave, ebony, and sibucao, of which large quantities are annually exported to China. So, too, in the mountainous parts of Iloilo, in the comandancia of Concepcion and in Guimaras, fine woods are found in large quantities, but the province most celebrated for the richness of its forest products is Capiz, where as many as 87 varieties of excellent building woods are known. From the forests large quantities of honey, wax, and pitch are gathered. The mineral resources of this island are of little importance. Quicksilver is believed to exist; so, too, with copper, although its situation is unknown. It is probable that beds of iron ore exist in some of the mountains, and there are many places in which gold is or may be worked, such as the vicinity of Dumarao, Binatusan and Lausan, etc. There are indications of coal or lignite in Busuanga, Balate, Valder-

rama, and other points. Several quarries are worked, such as those of Morobozo, Gutujan, Timunan, and Igan. There are also fine marbles found, and a beautiful tonalite, which may be substituted. Lime of most excellent quality is abundant in the district of Iloilo, where various quarries of excellent quality and hardness are found, particularly in Igbaras and in Mount Tinicoan. Cotton, corn, chocolate, pepper, coffee, tobacco, sugar cane and rice are cultivated with much success; the last two of excellent quality and in large quantities. On its grazing lands, which cover a great part of its area, much live stock is raised, in the district of Capiz alone there being more than 50,000 head, the greater part of them carabaos. The horses of Iloilo are greatly prized. Wild animals are very abundant, especially buffalo, deer, wild hogs, etc. Crocodiles abound in the rivers, and fish and shells in the waters of the sea; tortoise shell is also found.

THE ISLANDS ADJACENT TO PANAY.

The principal of these are: On the north coast, Borocay, the little islands of Mobay, and Tuat, Ocutaya, the little Zapatos, the North and South Gigantes or Sibuluac, Cabay and Sibuluac Lalaque. On the east coast, Maninigo, Nabunut, Balbagan, Tumumalayum, Gigantes, Binnluanganan, Calaguan, Sigocon, Canaz, Luginut, Bayas, Pan-de-Azucar, Culebra, Tagil, Malangaban, Danao, Sombrero Bagalri, Fagubanhan, the little islands of Sal and Seite Pecados, Guimaras, Nalunga and Nadulao, and Unison. On the western coast, Mangium, Balbatan, Maralison Islands, and the reefs of Cagayanes, or the seas of Cagayan, Cagancillo, Calija, and Caville.

We will speak briefly of some of the more important.

PAN-DE-AZUCAR.

This island is near the coast of Panay and is the largest of the five northern islands which are found at the north entrance of the channel to Iloilo. It is about 5 miles long, and of the two notable peaks which are seen the highest has an elevation of 621 meters above sea level. There are various smaller islands in the vicinity.

SIETE PECADOS.

This is a group of seven islands, or rather large rocks, situated in the middle of the channel from the Iguana bank and a little before reaching the sheltered water formed by the northern point of Guimaras and the coast of Panay. The highest of these is about 8 meters above the water, and all of them are precipitous.

GUIMARAS.

This island is situated at the southern entrance of the strait which separates Panay and Negros; it is very flat in front of the coast of Iloilo, with which it forms the channel of this name. The soil is fertile, and produces rice, hemp, cotton, corn, and tobacco in small quantities. The most important towns are Buenavista, with 4,383 inhabitants; Nagaba, with 6,297, besides a large number of small villages. The inhabitants of this island are occupied only in agriculture. They also engage in hunting and fishing, and in the manufacture of the ordinary and finer fabrics.

Toward the southeast of Guimaras are the little islands of Nadulao, Lalunga, Inampulugan, Nanoy Guinanon, and Panabulon, and other smaller islands of little importance.

THE DISTRICT OR PROVINCE OF ANTIQUE

BOUNDARIES.

The district or province of Antique is bounded on the north by the district of Capiz, on the east by that of Iloilo, and on the south and west by the sea.

AREA AND INHABITANTS.

The total area of this district is 472 square kilometers, 27 of these belonging to the adjacent islands. The number of registered inhabitants is 115,434.

LANGUAGE.

A somewhat modified form of Visayan is spoken.

NUMBER OF TOWNS, VILLAGES, AND PARISHES.

There are 19 towns having a population of over 10,000, among which are Sibolam, Culasi, and Pandan. Antique itself has 10,929; San Jose de Buenavista, the capital, has a population of 6,000; it is situated to the south of Point Dalipe, on level ground, and presents a beautiful appearance, as is indicated by its name. Besides the capital town are the following: Anmuy, with a population of 5,000; Antique, 10,929; Barbaza, 6,334; Bugason, 12,097; Cagancillo, 2,316; Culasi, 10,382; Dao, 7,635, Egaña and Guisijan, 3,086; Malupa, 2,534; Pandan, 8,837; Patnongon and San Remigio, 2,976; San Pedro, 6,190; Sebaste and Sibolam, 13,493; Tibiao, Valderrama, and Caritan. Among these Sibolam, with a population of 15,000, Pulasi, Pandan, and Antique, the former capital, figure as the most important. The number of villages is 53 and of hamlets 5. There are, besides. many hamlets of conquered pagans.

PRODUCTS, INDUSTRIES, COMMERCE, AND WAYS OF COMMUNICATION.

Within a few years this region has begun to develop agriculturally, and now produces considerable quantities of rice and sugar cane and lesser quantities of subacao, coffee, chocolate, and tobacco of excellent quality. In addition to agriculture, grazing is carried on, likewise the manufacture of sugar. Industries are confined to the manufacture of fabrics from pineapple fiber, jusi, and sinamay, which gives employment to some 12,000 women in about 7,000 shops. There is but little commerce in the interior. The export trade is carried on by means of small boats, which carry to Iloilo and Manila sugar, hemp, rice, and manufactured goods in large quantities, and sibacao, hides, etc., in smaller quantities. The importation in 1870 was 87,478 piculs, and the exportation 197,809. The forests contain a great variety of excellent building and cabinet woods, such as molave, ipil, banaba, durigon, alintatao, narra, etc.; an abundance of pitch, resin gum, mastic wax, and honey is also obtained in the forests. In the vicinity of the town of Antique there are also found immense beds of marble of various

colors and structure, more or less fine, but these have not been worked. In the island of Nagas seashells are found in abundance. During the dry season the roads can be traversed without difficulty, but during the wet season they become impassable for carriages. There are two cart roads which communicate with the adjacent districts; one starts from the town of San Jose, passing through all of the towns to the north and unites with the road in the district of Capiz, at Navas. The other, starting from San Jose, follows along through Antique and joins with a road in the province of Iloilo, at the town of San Joakin. These roads are interrupted by the mountains to the north and south, being reduced to paths more or less inaccessible, according to the time of the year.

PROVINCE OR DISTRICT OF CAPIZ.

BOUNDARIES AND AREA.

This district is in the northern part of Panay, and is bounded on the north and east from Point Bulacali to Point Naso by the sea, on the southeast by the mountain chain which separates it from Iloilo, and on the southwest by the mountain which separates it from the district of Antique. Included in this province are the islands of Carabes and Busacay and the smaller islands of Tabon, Malaya, Marava, Mahabangpulo, Masuleg, Fued, Batongbagni, Matalinga, Olutaya, Magotalipan, Negtig, Nasanda, Manapao, Banagay, and some others.

The area of the province is 4,547 square kilometers, and of the islands 55 square kilometers.

GENERAL CONDITION OF THE COUNTRY.

The country for the most part is flat and low, and exposed to frequent floods, except in the towns of Banga, Buruanga, Jamindang, and Sapian, which are situated in the mountains. All of the others occupy extensive lowlands, which are exceedingly fertile because of the large number of rivers and creeks which water them.

NUMBER OF INHABITANTS.

The population is about 224,000, although it is not easy to estimate this exactly on account of the large number of people scattered throughout the mountains of Balate, Ibajay, Libacao, Madalag, and Tapas, who acknowledge no other authority than that of their head men.

TOWNS, VILLAGES, AND PARISHES.

The capital, Capiz, situated on the bank of the river Panay, has a population of 22,000. Its appearance is very beautiful, the level land being traversed by broad highways, which offer communication with Iloilo and Antique. For its defense it has a small fort, containing a garrison. It is a telegraph station. Other towns are Balete, Banga, Bitan, Buruanga, Calivo, Cuartero, Dao, Dumalag, Dumaras, Ibajay, Ivisan, Jimeno, Jamindang, Jagnaya, Lezo, Libacao, Loctugan, Ma-Ayon, Macato, Madalag, Malinao, Mambusao, Navas, Numancia, Panay, 16,672; Pilar, 14,448; Pontevedra, 11,800; Panitan, Sapian, Sigma, Tangalan, and Tapaz.

PRODUCTS, INDUSTRY, COMMERCE, AND WAYS OF COMMUNICATION.

The forest products are very abundant, there being not less than 87 species of building woods. They are, however, very scarce near the capital and the coast towns. Pitch and resins of various kinds are obtained. Agriculture has advanced greatly during the last few years, among the products being rice, sugar, tobacco, hemp, indigo, chocolate, and corn. The manufacture of alcohol is of special importance, and includes some very large distilleries, the total annual product being more than 500,000 liters. Among other industries may be mentioned the manufacture of sugar sacks, hats of palm leaf, and baskets, and fabrics of silk, cotton, and hemp. These industries are common throughout the province. Commerce is not very flourishing. Trade is carried on at the weekly fairs, held on indicated days in all towns, the principal articles of trade being rice, hemp, pineapple fiber cloth, and dry fish. The export trade is carried on in small coasting vessels. Live stock figures among the wealth of the district, there being 45,624 head, having an approximate value of $324,504. The highways are in good condition during the dry season, but are almost impassable for carriages during the wet season. In certain parts of the district there are mines of gold and other metals.

THE DISTRICT OF ILOILO.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

This district includes all of the southeastern coast of the island of Panay, from Point Bula Cate, in latitude 11° 34′ north on the northeast, to Point Nasog, in latitude 10° 24′ north on the south. It has a coast line of 140 miles. It is bounded north by the district of Capiz, on the east by the strait and island of Guimaras, on the west by the province of Antique, and on the south by the Mindoro Sea. The following islands pertain to the district of Iloilo: Guimaras and Inampulugan and the little islands of Nadules, Salinga, Nanay, Nalibas, Nagarao, Susan, Guianon, Panabulon, Lugaran, Tandog, Babalod, Tunginban, and the group of Siete Pecados, and others more insignificant still.

The general aspect of the district is that of a well cultivated and planted park, dotted with well-built and commodious houses, which are shaded by beautiful fruit trees. The towns are almost all large, clean, and well built. In no other province or district are there so many beautiful churches; they are all of stone, their architecture being pleasing. The cemetery of Ianinay is especially notable. No other province is crossed by as many well-built roads and byways.

AREA AND INHABITANTS.

The area is 3,755 square kilometers, not counting the 806 square kilometers of the comandancia of Concepcion, which in reality belongs to this district. The area of the islands belonging to it is 598 square kilometers. After Manila this province is the most populous of the archipelago, having, according to the official census of 1887, 423,462 inhabitants. In all of the towns, especially those of the coast, there are many European and Chinese half-castes, and in this province many Chinese are found. In the mountains separating the province from Capiz and Antique there are many families of Negritos of Aetas.

These lead a miserable existence and are rapidly diminishing. More numerous and important are the tribes and families of natives living in the mountains. These are in reality, in race, language, and customs, Visayans, the most of them being refugees from the towns.

LANGUAGE.

As in other parts of the island, Visaya is spoken.

TOWNS, VILLAGES, AND PARISHES.

The capital of the province is of the same name, Iloilo, and is situated on the southeastern coast of Panay, on an excellent and well-protected port suitable for ships of 15-foot draft. The city is built on an irregular plan, its two principal streets following the course of the river. Its houses are excellent and of good construction, there being constant improvement in this direction. According to the Official Guide for 1887 it had a population of 11,884. It is, next to Manila, the most important commercial town in the Philippines, as well in exports as in imports. It has, like Manila, an ayuntamiento, established by decree, and banking houses. It has a city and suburban police force. Among the important buildings may be mentioned the government house, the church, the office of the captain of the port, the convent, and the jail. The river Iloilo is an arm of the sea, which, after passing through the capital and the towns of Iloilo, Arivalo, and Otorca, empties into the ocean. It allows of the entrance at all times of ships of good size and offers excellent protection against storms. Oil, vinegar, cocoa wine, lime, mats, and various articles of palm wood are manufactured. Jaro, formerly Santa Isabel, with a population of 13,070, is situated on flat land along the right bank of the large river of the same name. This river is navigable for boats of considerable size, and has a commodious port for such shipping. A stone bridge crosses it. This town, located about 4 miles from Iloilo, was founded in 1584 or 1585. It was made an episcopal see, separating it from that of Cebu, by bull of Pius IX, 1865. It has a fine cathedral, episcopal palace, seminary, and some fine private houses. Like Iloilo, it has its ayuntamiento.

Other towns of the district are: Alimadian, Anilao, Arivalo, Baratae Nueva, Baratae Viejo, Banate, Buenavista, Cabatuan, with 20,035 inhabitants; Calinog, Cordoba, Dingke, with 12,098 Dueñas; Dimanges, with 15,178; Guimbal, Igbaras, with 11,359; Janinay, with 26,460; La Pax, Lambunao, Leganes, Leon, with 14,714; Lucena, Maasin, Mandurriao Miagao, Mina, Molo, Nagaba, Oton, with 13,883; Passi, with 14,688; Pavia, with 6,328; Pototan, with 15,939; San Enrique, San Miguel, San Joaquin, with 13,649; Santa Barbara, with 19,717; Tigbanan, with 16,850; Tubungan, Zarraga, and Novales.

PRODUCTS AND INDUSTRIES.

The principal products of this province are sugar cane, wheat, corn, rice, coffee, chocolate, tobacco, hemp, and other agricultural products. There are 37,552 farm hands. Mines of gold and other metals and quarries of fine stone are found in the province. The inhabitants make excellent fabrics of pineapple fiber, jusi, sinamay, and cotton. As the province has abundant pasture land, cattle, carabaos, sheep,

and horses of fine grade are raised in all the towns. There is a total of 153,439 head of live stock, the greater part being cattle. The port of Iloilo, the second in the archipelago in commercial activity, both foreign and domestic, was thrown open to commerce in 1855. There are 30,000 looms in the province.

PROVINCE OR DISTRICT OF CONCEPCION.

AREA AND BOUNDARIES.

This comandancia and dependency of the district of Iloilo is situated in the extreme northeast of Panay.

The following islands are dependencies of this district: Binnbuangan, Calagnan, Sicogon, Pan de Azucar, Tago, Bulibadiangan, and Tagubanhan, and the little islands of Calabazas, Baybang, Nasichuan Point Brin, Salog, Binassan, Ananayan, Bagabu, Sombrero, Dunao, Mangaban, Builag, Bitad, Naburat, Magoise, Culebra, Panganoncolangan, Bayas Tumugum, Canaz, Luginut, Adialayo, Tabugun Pulupinta Talunanaim, Balbagan, Nabunut, Manigonigo, Gigante Norte or Sibulnacbabay, Gigante Sur or Sibuluaclalaqui, Uaidajon, Bantiqui, Cabayao, Antonio, and others still smaller.

NUMBER OF INHABITANTS.

The number of inhabitants, according to the Official Guide of the Philippines for 1897, is 38,982.

TOWNS, VILLAGES, AND PARISHES.

Concepcion, the capital, located on an excellent anchorage, has a population of more than 4,000. Ajui, with the village of Bolasi, has a population of 6,228. Other towns are Balasan, Carlos, Limery, S. Dionisio, Sara, with 11,746; Batad, and Estancia, with 12,564.

PRODUCTS AND INDUSTRY.

The products are those common to all of Panay. The principal industry is the manufacture of sugar.

CHAPTER VIII.

VISAYAS (B).

[Maps Nos. 21, 22, and 23 of the Atlas of the Philippines.]

ISLAND OF NEGROS.

BOUNDARIES AND GENERAL CONDITION OF THE ISLAND.

The island of Negros, belonging to the Visayan group, is situated between Panay on the west and Cebu on the east. It is in shape elongated from north to south, presenting an extensive, high and rounded appearance on the southwestern part, where the mountain chain of Sojatas, dominated by the highest of its peaks, is found. Its boundaries are, on the north the Visayan Sea, on the south the sea which separates it from Mindoro, on the east the channel separating it from Cebu, and on the west the Jolo Sea.

GENERAL APPEARANCE.

The spurs from the central dividing mountain chain of the island have beautiful, large valleys, which are inhabited only on the western side from Sajotas to Silay, on the north and northeast, where extensive plains cut by rivers of good size are found. Although the land is somewhat rugged, it is very fertile in the cultivated part, because of the numerous rivers which water it. The central part of the island is unexplored. The coast is fairly regular and on the south and east rather bold, presenting few bays and no ports.

AREA AND INHABITANTS.

The island is 220 kilometers in length by 87 in breadth at Sajotas, and has an area of 9,341 square kilometers. The population is 240,000. Some of them are Visayans and others Panayanos.

The island has recently been divided into two provinces, Western and Eastern Negros.

LANGUAGES.

The language commonly used is Visaya, the pagans and mountain people using Panayano.

PRODUCTS.

The island produces in abundance the best quality of chocolate in the Visayas, also wax, rice, wheat, corn, sugar cane, coffee, tobacco, cotton, hemp, bago, and sibucao, etc. Cattle, horses, hogs, and carabaos are found in abundance. The forests produce an abundance of fine building woods, among these being teak. Fish, tortoise shell, sea

cucumbers, gulaman, sea shells, lagan, etc., are found in abundance along the shores, but the inhabitants, little given to work, do not pay much attention to this industry. Along the western coast, near the mountains of Uling and Alpaco, good coal mines have recently been found. The industries are limited to the weaving of hemp and palm.

FIRST DISTRICT—WESTERN NEGROS.

BOUNDARIES, ETC.

This district is bounded on the north by the islands of Sibuyan and Romblon, on the east by the province of Eastern Negros, on the south by Mindanao, and on the west by the island of Panay, occupying, therefore, as is indicated by its name, the western part of the island from the east to the watershed of the central mountain range.

GENERAL CHARACTER OF THE COUNTRY.

This province is very fertile, and, thanks to constant work and the improvements introduced by the many Europeans who have established themselves there, it can be placed in the front rank of all the provinces of the archipelago. Hydraulic and steam machinery is abundant, as is apparatus for the working and cultivation of the soil and the extraction of sugar. A broad carriage road uniting the various towns contributes to the development of commerce.

AREA.

The area is 5,800 square kilometers.

INHABITANTS.

There is a population of 231,512.

TOWNS.

Bacolod, situated on uneven ground near the seacoast, has a population of 11,624, and is the capital. It has some fine public and private buildings, among them being the church and convent, the government house, the town hall, and others. Other towns are Arguelles, Bajo, with 13,390; Binalbagan, Cabangcalan, Cadiz Nueva, Calatrava, Canayan, Dancalan, Escalante Granada, Guinigaran, 13,620; Ginjungan, Guimbalaon, 11,670; Ilog, Isabela, 12,310; Isin, Jinamalayan, La Carlota, 12,117; Manapla, Minuluan, 12,132; Murcia, Pontevedra, 10,901; San Enrique, Saravia, Silay, 13,780; Suay, Suinag, and Valladolid.

SECOND DISTRICT—EASTERN NEGROS.

BOUNDARIES.

This district is bounded on the north and west by Western Negros, on the east by the islands of Cebu and Bohol, and on the south by Mindanao.

AREA.

It has an area of 3,541 square kilometers.

INHABITANTS.

According to the last census the population was 140.489. This district is not so fertile as the previous one, but, nevertheless, native labor, stimulated by Europeans, produces crops of sugar cane, hemp, rice, chocolate, coffee, and cotton. The industries consist of the manufacture of sugar and of the sacks in which the sugar is packed. The manufacture of cotton pillows is notable, as they are carried in large numbers to all parts by steamers.

TOWNS, ETC.

Dumaguete is situated on level ground, on the southeastern coast of the island, near the mouth of the river of the same name. It is the capital town and has a population of 14,352. Other towns are Amblan, Ayungan, Bacong, with 10,129; Bais, Bayanan, Canoan, Dauin, Guijuhugan, Jimalalud, Lacy, Manjuyed, Maria, Nueva Valencia, San Juan, Siaton, Sibulan, Siguijoc, Tangay, 11,743; Tayason, Tolon, and Zamboanguita.

ADJACENT ISLANDS.

There is almost no island of importance near Negros. Bacabac is a little island, half a mile long, situated 2½ miles to the northeast of Point Sagay, and divides Tañon Strait into two channels. In Tañon Strait, near the eastern coast of Negros, is the little island and anchorage of Refugio, a mile from the coast in front of Tabon. It is high in the northern part and is 1½ miles long from north to south and 1 mile wide from east to west. The Bais Islands are but little islands in the bay of the same name. Apo Island is situated 3½ miles south, 77° east of Point Zamboanguita. On the southeast there are two little islands, Dajugan and Agutian.

ISLAND OF CEBU.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

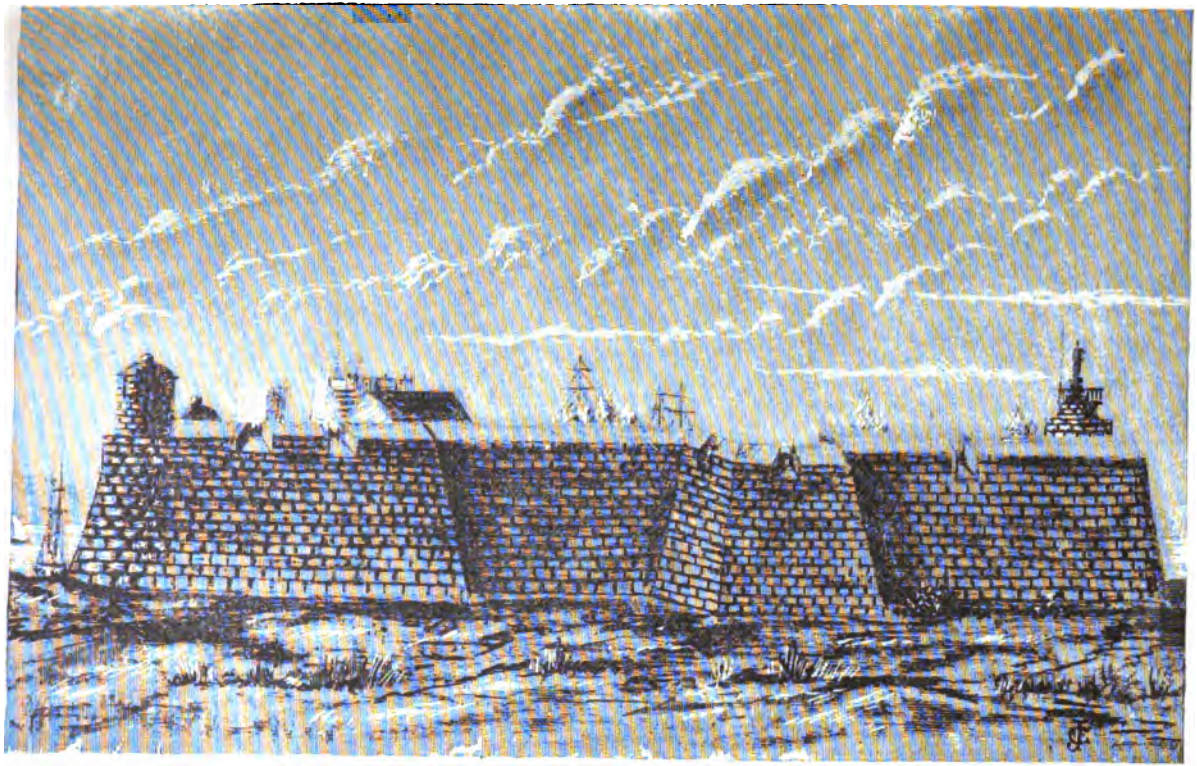
This island forms part of the Visayan Group and is situated exactly in the center of it. It is included between the parallels of 9° 25′ 46″ and 11° 16′ 37″ north latitude. To the north is the island of Masbate, to the south Siquijor, to the east Leyte, Camotes, Maston, and Bohol, and to the west Batayan and Negros. The eastern coast is washed by the Sea of Cebu and the western by the Strait of Tañon, which separates it from Negros. Its outlines are irregular, the island being elongated and narrow in the direction of north-northeast to south-southwest.

AREA.

It is 216 kilometers in length and 36 in width at its broadest part. Its area is 6,582 square kilometers, including the adjacent islands.

INHABITANTS.

According to the data published in the Bulletin de Cebu, the population at the beginning of 1888 was 518,032, distributed among 52 towns. The population for each square mile, therefore, reaches the respectable figure of 123.



FORTRESS OF CEBU.

TOWNS, ETC.

The capital, Cebu, is situated on the eastern coast of the island; the climate is hot, but even and healthful. It has a magnificent port formed by the two islands of Mactan and Opon, which protect it from all winds. The country in the vicinity is level, but stony and sandy; the town contains about 2,000 buildings, and has a population of 14,300; the streets are laid out on a regular plan; are wide and free from stones. The government house is a fairly good building; the episcopal palace, although small, is likewise worthy of mention on account of its interior decorations. The cathedral, finished toward the end of the last century, is a magnificent temple; in it is preserved the cross which, according to tradition, was planted by Magellan in Cebu on taking possession of the island. The Augustin Church is magnificent, while the Recolleto Convent and the Seminary of San Carlos, formerly the Jesuit College, are worthy of mention. The city is cut by a small river of little importance, but well supplied with water. In front of the city, to the east, is the little island of Mactan, where the illustrious Magellan, a victim of his valor, terminated his days. Just outside of the town are located a fine cemetery; a large leper hospital and an artillery fort, with a garrison of troops (see plate 27). The towns included in this district are Alcantara, Alcoy, Alegria, Aloguinsan, Argao, with 34,252; Asturias, Badian, Barili, Balangbang, Bantayan, Bago, Boljoon, Borbon, Carcar, 34,096; Carmen, Catmon, Compestela, Consolarion, Cordoba, Daan, Bantayan, Dalaguese, 20,257; Danao, Dumanjug, El Pardo, 10,007; Gintalin, Liloan, Madrilejos, Malaboyoc, Mandane, Medellin, Moalboal, Minglanilla, 10,767; Naga, 16,519; Nueva Caceres, Oslob, Pilar, Pinamungajan, Poro, Ronda, Samboan, Santander, San Fernando, 18,811; Santa Fe, San Francisco, San Nicolas, Sogod, San Renugio, Sibongan, 24,934; Tagobon, Tudela, Talamban, Talisay, 19,229; Toledo, and Tuburan.

PRODUCTS, ETC.

The forests in the mountains produce excellent building woods. Birds, reptiles, deer, and wild hogs abound in them. The principal products are rice, excellent chocolate, corn, a fair grade of sugar, cotton, vegetables, and fruits, but the scarcity of rains and of land suitable for cultivation prevents the development of agriculture to the same degree as in other districts. In the waters along the coast are found the celebrated regadera de Cebu (euplectella, glas sponge, or Venus flower basket), the only one of its genus, and the rare and much sought shell gloria maris. Coal beds were discovered here in 1827, before they were found in any other part of the archipelago. The principal deposits are those of Alpaco, Uling, Guylaguyla, Noga, Dapano, and Campostela. The numerous experiments made with this coal render it certain that, although it is inferior to English coal, it is quite suitable for the use of steamboats and industries, it being considered superior to that from Australia. Gold and silver-bearing lead ores are found in the central part of the island at Panapag, Consalacion, Acsubing, and Budtam. There is also some auriferous soil which still shows traces of ancient washings.

The industries of Cebu are limited to the manufacture of sugar, of cocoanut wine, salt, pottery, fabrics of silk, and sinamay hemp, and

cotton and sugar sacks. The cake and cheese of Cebu are also well known. Cebu carries on important domestic commerce with Manila, Camaguin, Bohol, Negros, Surigao, and Cagayan de Misamis. The most important ports are Bago, Carmen, Danao, Cebu, Carcar, and Argao, on the east, and Bantayan, Tuburan Balangbang, and Barila, on the west. Along the eastern coast there is a highway that unites 21 towns with the capital, and on the west an excellent road uniting the various towns.

THE ADJACENT ISLANDS.

On the east coast is the little island of Capitancillo, situated 2½ miles to the east of Point Saac; it is circular in form and has some trees growing on it. The little island of Calangaman is situated 12 miles east northeast of Point Nailon and almost west northwest of the entrance of Port Palompon, in the island of Leyte, and has a fixed white light situated on Point Bagacay.

MACTAN.

This island, famous in history, is situated in front of the city of Cebu; it is very flat and almost entirely covered with mangrove swamps, which are flooded during high tide, so that but little land is above water. It is covered with cocoanut groves. On this island is the town of Opon, with a population of 12,745. The inhabitants are engaged in fisheries or in the manufacture of salt.

OLANGO

Is a small island east of Mactan of little importance.

SUMILON.

This island is situated 3 miles to the east northeast of Point Panon, and about 1½ miles from the mainland; it is about two-thirds of a mile in length and about 54 meters high. It is clean and rugged, having sandy beaches and rocky bluffs along the coast.

THE WEST COAST.

Bantayan.—This island is situated west of the northern point of Cebu and more than 17 miles to the northwest of the northeastern point of Negros; it is rather low, the highest part being about the middle of the eastern coast; it is 10½ miles long from north northwest to south southeast, and about 4 miles broad. The nine islands which compose the group about Bantayan are surrounded by shoals, which are dry at low tide and permit a passage on foot from one to the other. The Gilantagnan islands are two in number, the largest of which is situated 2½ miles to the north of Point Ogton, and the smaller between this and the coast. The town of Bantayan is the most important on the island and is situated on the southwestern coast on a little tongue of sandy land; including the inhabitants of the villages of Ogton and Lanis, it has a population of 14,400, all of whom are engaged in the collection of pearls, mother of pearl, tortoise shell, sea cucumbers, gumalon, and lagan.

The Doong Islands.—These islands extend for 10 miles to the southwest from Point Pasil de Bantayan in the direction of Point Sagal, on the island of Negros. They are of little importance.

ISLANDS ON THE NORTH.

Guiantacan.—This island is situated between Lanis, the northern extremity of the island of Bantayan, and Point Candaya. It is covered with trees, and is low, narrow, and long, being 6½ miles from north to south.

Tibinil.—This island is situated a mile in front of Point Canit. It is of medium height and about 2 miles in length from north to south.

Malapascua.—This island is called by the natives "Lugon." It is situated 3 miles to the northeast of Point Bulalaqui. Sea cucumbers and tortoise shells are abundant along the coast. The shores are covered with juniper trees, known in this country by the name of "agojos."

ISLAND OF BOHOL.

BOUNDARIES.

This island belongs to the Visayan group, and is situated between Cebu on the west and Leyte on the northeast.

GENERAL CHARACTER OF THE COUNTRY.

The interior of the island is mountainous. The coasts are low and sandy, and as a general rule do not offer security to ships, although there are some good ports or bays, which will not, however, admit ships of much draft. The caves of the center of the island are worthy of mention. They are very large, with great subterranean galleries adorned with fanciful stalagmites and stalactites.

United to the district of Bohol are the islands of Siguijor and Danis.

AREA.

The area of the district is 2,380 square kilometers.

INHABITANTS.

The number of people in the district is 260,000. The Bohol people are quite active and initiative, being distinguished from the rest of the inhabitants of the archipelago. The skill of these people in the use of the lance is as famous as that of the Moros in the use of the campilan. The Moros have at all times held their valor in great respect.

LANGUAGES.

Visaya is spoken, although there are so many local modifications that it has been called Boholano or Bohol-Visayan.

TOWNS.

The capital, Tagbilaran, situated in the southwestern part in front of the island of Panglao, from which it is separated by a narrow strait, has a population of 9,471. The other towns are: Anda, Antequera,

with 11,254; Badayon, Balilijan, Batuanan, Calapa, with 10,100; Candijay, Carmen, Catigbian, Cosella, Corres, Danis, Duniao, Duero, Garcia, Hernandez, Getafe, Guinduhnan, Inabanga, with 10,543; Ipil, Jagna, with 12,700; Lila, Loay, Loboc, with 10,900; Loan, with 19,006; Maribojoc, with 10,700; Manglao, Sevilla, Sierra Bullones, Talibong, Tubigan, with 14,272; Ubay, Valencia, and Villar.

PRODUCTS, INDUSTRIES, AND WAYS OF COMMUNICATION.

The soil is not very fertile, but with good care produces considerable quantities of rice, coffee, tobacco, cotton, corn, millet, sweet potatoes, and other useful agricultural products. Building woods are quite abundant. There are indications of the existence of phosphate and iron, copper, and coal. Many mineral springs are found. The industries are confined to the weaving of various fabrics, such as silk, pineapple, and cotton, and the making of very serviceable blankets and napkins, and of sinamay. Valuable mats are made from the rush called "ticay." They manufacture most delicious bread and biscuits. The exports are cocoanuts, sea cucumbers, wax, seashells, and pearls. The towns of the interior communicate with one another by means of paths. All of the others are united by cart roads suitable for carriages.

ADJACENT ISLANDS.

NORTH COAST.

In front of this coast are situated Pandan and Cabulan, to the north-northwest of Point Lanis; Manacan, Bahanay, and Tambu, and a very large number of little islands, rocks, and reefs.

LAPINIG.

Toward the northeast is the island of Lapinig or Minoc, separated from Bohol by a narrow channel. It is very low, covered with scrubby brush, and is about 8 miles long. Timibo is a little island situated southeast of its northern end. Lapinig Chico is almost united to the larger island on the southwest coast.

EASTERN COAST.

The little islands of Tintiman, Lumites, and Tabon are situated on this coast.

SOUTHERN COAST.

This coast is very much cleaner than the northern coast, having but one island, Pamilacan, toward the southeast channel of Tagbilaran.

WESTERN COAST.

Panglao.—This is a little island very close to the southwestern coast of Bohol, from which it is separated by the channel of Tagbilaran. During low tide one can pass on foot from one island to the other in the southeastern part of the channel. It contains two towns, Panglao, on the eastern coast, with a population of 6,865, and Danis, on the western, with a population of 7,985. The coast is unprotected,

and has no place where boats may anchor. To the southeast of Panglao rises the little island of Balicasag. The little islands of Sandigan, Cabilao, and Capalape are situated along the coast between Loon and Calape.

Sequijor.—This island is the most important and populous of those around Bohol. It is situated southeast of the lower part of Negros and almost south of the strait which separates Cebu and Bohol, a distance of 23 kilometers southeast of the southern entrance of Tañon Strait. The island is of but little altitude, very much broken, and is formed of the central mountain, from whose sides flow in all directions the little streams which fertilize the island. Northeast of the central mountain is Mount Gudringan, whose sides on the north and east form Points Sandugan and Daquit. This island measures 27 kilometers from west-northwest to east-southeast and 20 kilometers from north to south.

The products of the island are tobacco of excellent quality, rice, corn (scarcely sufficient for the wants of the people of the island), hemp, and chocolate, which is exchanged for wax and cotton. A considerable amount of rough hemp cloth is exported. Tortoise shell, sea cucumbers, and birds' nests of inferior quality are collected.

The principal towns are Sequijor, on the best port of the island, with a population of 11,695; Canoan, with 10,695; Lasay, with 7,629; San Juan, with 6,171, and Maria, with 5,556. This is the most densely populated island of its size, it having 88 inhabitants to the square kilometer.

CHAPTER IX.

VISAYAS (C).

SAMAR, LEYTE, AND THE ADJACENT ISLANDS.

[Maps Nos. 18, 19, and 30 of the Atlas of the Philippines.]

ISLAND OF SAMAR.

BOUNDARIES AND GENERAL CONDITION OF THE COUNTRY.

This large island, formerly called Ibabao, is the most eastern of the Visayas. It is situated southeast of the eastern part of the island of Luzon, from which it is separated by the Strait of San Bernardino. Toward the southwest it is separated from the island of Leyte by the narrow Strait of San Juanico, which runs from north to south, lying between the southwestern coast of Samar and the northeastern coast of Leyte, and uniting that arm of the sea called the Western Sea of Samar on the north and the bay of San Pedro and San Pablo on the south. The Western Sea of Samar is the body of water lying between the western coast of the island of Samar, the northern coast of Leyte, and the eastern coast of Masbate. In it are situated the islands of Biliran, Paresan, Buad, Maripipi, Canahahuan, Libucan, Mesa, Sibugay Tagapula, and others of lesser importance. It is a part of the sea not well known, and is still quite dangerous to navigate. In general the coasts of Samar still require detailed exploration, in particular the eastern coast, which is irregular, mountainous, and bordered with small islands and large rocks.

The district of Samar, in addition to the island of this name, includes the small islands adjacent to its coast, among which may be mentioned as most important Bolicuatro, Bateg, Capul, Dalupiri or Puercos, Jomayol or Malhon, Laguan or Lavang, or Calamutanay, Manican, Parasan, Buadlos, Nazanjos, Mesa, Tagapula, and Limbacanayan.

The shape of this island is that of an oblong square, but is very irregular in the southwestern part. It is about 20 leagues long in a straight line from north to south, and about 20 leagues wide in the northern part from east to west. The country is mountainous, although there are many fine valleys under cultivation.

AREA AND INHABITANTS.

The area of the island of Samar and the adjacent islands is estimated to be 13,471 square kilometers, and its population 185,386. In the mountains there are about 10,000 native refugees who live an independent and almost savage life.

TOWNS.

About the middle of the western coast of the island is the town of Catbalogan, the capital of the district. It is a much frequented port. Its population is 6,072. Other towns are Balangiga, with 4,130; Basey, with 12,852; Bobon, Borongan, with 12,563; Calbayog, with 20,725; Calviga, Capul, Catarman, with 9,495; Catubig, with 11,517; Gandara, with 11,101; Guiuan, with 12,872; Hernani, Jiabon, La Granja, Lanan, Oras, Palapag, Pambujan, Palanes, Paric, Pinabigdao, Quinapundan, San Julian, Saliedo, San Sebastian, Santa Rita, Sutat, Taranguan, Tubig, Villareal, Tumarraga, Santa Margarita, Santo Niño, and Weyler.

PRODUCTS.

The products of the island are such as are found in all the archipelago. There are many fine kinds of wood, especially those suitable for shipbuilding, many varieties of wild fruits, various kinds of bamboo, roots suitable for food, rattan, game, and fish. Wax and honey, abundant in the extensive forests, are much prized by the inhabitants; cocoanuts are abundant, and many of the inhabitants are engaged in extracting the oil, particularly in the vicinity of Guinan. At the present time the three most important products are rice, cocoanuts, and hemp. Among the medicinal plants grown in this island the most famous is the seed called "isigud" or the fruit of San Ignacio, known also as Catbalogan seed, because it is grown in the vicinity of that town. It has many excellent properties and is claimed by some to be an antidote for certain kinds of poisons. (1) Father Murillo, S. J., in his historical geography, speaking of these seeds, says that in Peking they are much sought after by the Chinese, because they proved so efficacious in an epidemic of cholera, no one dying who took this remedy. There are, besides, many other plants having well-known medicinal value.

ADJACENT ISLANDS.

There are perhaps 300 islands bordering Samar, of which only the most important will be mentioned.

NORTHWESTERN COAST.

The Balicuatro Islands, situated on the northern coast of Samar, lie between Points Balicuatro and Babon, about 18 miles to the east of the former. They form two groups with Viri on the west, composed of 4 islands, and the group of Cabauan Grande on the east.

Viri group.—The principal island, Viri, is situated 3½ miles from Balicuatro Point. It is about 4 miles long and 3 miles broad. Its two towns are Enriqueta and Viri. Quimagaligan Island is situated between Viri and Samar, and has one town of the same name as the island.

Cabaulan Grande group is situated to the east of Viri and near to the coast of Samar. The principal island of the group is Cabaulan Grande.

Along the same northern coast are found the islands of Laguan, Batag, and Cahagayan, which form and shelter the famous port of of Palapag. The island of Bacan is about 3 miles to the east of Port

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Palapag and very near to the coast of Samar. In general the northern coast of Samar is bordered with islands, shoals, and rocks, which render navigation very difficult.

THE WEST COAST.

Capul.—This island lies southeast of the Ticlines group, with which it forms the Strait of San Bernardino. It is of medium altitude, the highest lands being in the vicinity of Abac, which lies on the western coast, 2½ miles from the southern point of the islands. The town of Abac has a population of 6,834. In the northern part of the island is the bay known as Puerta de Galeras. Copper is found in the mountains.

TICLINES GROUP.

This group, composed of three islands, called Calintan, Tuac, and Ticlin, forms, with the coast of Luzon, the Strait of Ticlines, which runs from northeast to southwest.

Calintan.—This island lies about 5 cables' length to the southeast of Point Culasi; it is the most southern of the Ticlines and about a mile in length. Its forests abound in ebony.

Tuac, an island near to and south of Calintan, having a length of 1½ miles from north to south and a breadth of one-half a mile from east to west, is likewise mountainous and covered with ebony trees.

Ticlin.—This island is situated two-thirds of a mile from Point Pandan.

Naranjos Islands.—This group, situated 7 miles to the south of Tajiran on the coast of Luzon, is formed by the six little islands called San Anreas, Rosa, Del Medio, De la Darsena, De la Aguada, and Escarpada.

Dalupiri, or Hog Island, is situated between the island of Capul and the western coast of Samar; it is low, covered with trees, and surrounded by a rock-strewn beach. It has two towns or villages, Dalupiri and El Pilar. Game is very abundant, especially wild hogs. In the central part there is a lake containing large numbers of crocodiles.

Tagapula.—This island, in the southern part of the Naranjos group, is mountainous and has but one small village.

Mesa, a small island southeast of Tagapula, is also mountainous.

Limbancanayan is situated east of Mesa or Talajit; it is quite flat and has one town, Santo Niño, with a population of 5,640, and one village.

Camandag (*Sibugay*), an island to the east-northeast of Mesa, is circular in form, of medium elevation, and about 2 miles in diameter.

Libucan group.—This is a little group, composed of three islands and various isles, 4½ miles west of Point Traguan.

Libucan-Daco, about 2 miles in length, is the largest of the group and has a good anchorage.

Tangad-Libucan is a small island 1 mile northwest of Libucan-Daco. To the southwest of the principal island of the group are the little islands of Maraquit-Daquit, and to the southeast the Lalaya isles.

Buri.—This island is 2¾ miles to the northwest of Catbalogan; it has two anchorages, one to the east and the other to the north.

In some of these former islands there are villages or hamlets.

Canahauan Islands.—These islands are situated near the western coast of Samar, 8 miles to the southwest of Catbalogan. They include

various islands and isles, as follows: Timpasan, Canalinan-daco, Canalinan-gutiay, Boloang, Cavantiguianes, Balading-daco, and Batgongon. These islands lie in the form of an ellipse, 4½ miles long in the direction west, northwest, south, southeast, and 2½ miles in breadth, in the center of which is a fine anchorage, protected against all the monsoons.

The great Bay of Maqueda is formed by the coast south of Catbalogan and the islands of Parasan and Buad.

Parasan.—This island, lying at the entrance of the Bay of Maqueda, is 10 miles long from north to south, 5 miles wide, very low, and has some sandy beaches. It has one town, of the same name as the island.

Buad, an island lying to the east of Parasan, at the entrance of the Bay of Maqueda, is almost circular in shape, about 4½ miles in diameter, and has but little elevation. The town of Buad is of little importance. The town of Zumarraga, on the west coast, has a population of 6,404. There are several villages.

Daran.—This is the largest of the islands bordering Samar, and extends irregularly from north to south, forming two peninsulas of almost equal size. It is low and has extensive mangrove swamps. It is situated west of Parasan and Buad and is surrounded by little islands. Along the shore there are some villages and hamlets of little importance.

Lintarcan is an island to the south of the bay of Maqueda, in the northern part of the entrance to the strait formed by the island of Daran, on the coast of Samar. It has a few villages or hamlets along the coast.

Canal de Tanatabas is in the west, northwest extremity of the strait of San Juanico, which separates Samar and Leyte.

Tanaban and Tanabaay.—These island are situated in the middle of the channel.

Tabualla.—This island is situated above the rounded point which terminates the narrow entrance of the channel on the north coast.

Tanabon lies southeast of Jabualla and Tanabaay; it is triangular in shape and elongated from northwest to southeast. Many rocks lie along the coast. At the northern entrance of the famous channel of San Juanico is the so-called strait of Santa Rita, the name being that of a town of 3,014 inhabitants, situated on the western coast of Samar.

STRAIT OF SAN JUANICO.

This strait is one of the most attractive natural scenes in the archipelago. It has an average width of 6 cables length, but in certain places is not over 2 cables in width. It is neither regular in depth nor in the character of the bottom, the soundings varying from 9 meters to 20 meters in the middle of the channel. In general, the bottom is covered with shells in the north and sand in the south, some places being rocky. Many little islands and shoals render this picturesque channel still narrower. The currents in the channel and the character of the coasts render navigation very difficult. In the low caves in the bluffs along the coasts on the Samar side of this channel the remains of human skeletons have been found which in size are much superior to those of the actual inhabitants of the neighboring islands.

BAY OF SAN PEDRO AND SAN PABLO.

The strait of San Juanico terminates on the south in the bay of San Pedro and San Pablo. The town of Guintuhan is at the head of this bay, on the most western of the two arms, into which the Cadann or Vasey River enters.

RIO VASEY AND THE CAVES OF SAJOTON.

The tide water of this river, as indicated by the nipa groves, reaches several miles inland; from there the river is very shallow and rapid, presently passing a natural arch formed by two fallen rocks supporting each other and surrounded by limestone rocks from 10 to 12 meters high. In front, and opening like a mouth, rises a sort of portal of rocks of beautiful appearance; they are 8 or 10 meters in height, and through the opening a part of the river may be seen. In the wall on the left of this oval court, 11 meters above the water, a cave opens, quite easy of access. This cave is about 28 meters in depth and terminates in a narrow part, where a species of table or altar is formed of the limestone rock. There is found an open space, and the grouping of the rocks shows them to be the remains of a stalactite cavern, whose roof has fallen in. This is the place called "Cuevas de Sojoton."

In a little indentation to the east of the bay, about 5 miles from the Vasey, is the little town of Pansignican, and about a mile and a half south of this town is Basiao. Between them is a series of picturesque rocks, reaching an altitude of 28 meters; they are rounded and their summits covered with vegetation, and worn away on their bases by the action of the water, appearing to rise as gigantic mushrooms above the waves. In ancient times the inhabitants buried their heroes and old people on these rocks, placing in the coffins all of the objects which were most valued during life.

GUIMANOC.

This little island, situated at the head of the bay and in front of the river Vasey, is regular in outline, high, and formed on a table.

THE SOUTH COAST.

Manicani.—This island is situated 4½ miles to the southwest of the town of Guinan; it is almost circular, 2½ miles in diameter, and has a central mountain of medium height. It is surrounded on all sides, except the northwest, by a reef about 3 cables in length. It has a roomy anchorage between the bluffs on the north of this island and the coast. Various small islands extend in all directions in front of this anchorage. The point south of Samar terminates in a little island very close to the shore.

THE EAST COAST.

This coast is very little known. While on an expedition to the southern part of Samar we had occasion to admire the magnificent natural port of Pambujan, which, in our opinion, is the best in all the islands. It is situated between points Maritiano and Buri, and is easy

of entrance, clear and deep, having in its interior a channel called Tangbab, which is well protected from all winds. It is formed by a series of small islands extending parallel to the coast between Pambujan and Hernani.

A few miles to the north of Pambujan is the famous port of Borongon, at the entrance of which are the islands of Audis and Davinnbo.

To the north of Salat are the islands of Catalaban and Anchao.

More to the north, in front of the port or bay of Oray, lie the islands of Hilaban and Tubabao. To the south-southeast of Hilaban there extends a series of islands in the form of a semicircle, terminating in the little island of Pasig, in front of the town of Dolores.

THE NORTH COAST.

The important islands here are as follows:

Laguan.—This island forms, with the island of Samar, a narrow channel, which unites the bay of Lagnan with the strait of Calomatan. The town of Lagnan, situated in the southwestern part, has a population of 7,773. There are several villages on this well-populated island.

Batag.—This island is situated to the north-northeast of Lagnan. It is rather low, and aids in sheltering Port Palapag. There are but few inhabitants, the only important village being Mahinog.

Cahagayan.—This is the smallest of the islands which form the port of Palapag; it is surrounded by rocks.

Bacon.—This island lies 3 miles east of the port of Palapag, and very near to the coast of Samar; it is formed of high, rocky land. All the coast of the north offers but little security to shipping, on account of the reefs and little islands which rise close to it.

THE ISLAND OF LEYTE.

BOUNDARIES AND GENERAL ASPECT OF THE COUNTRY.

This island, belonging to the Visayas, is situated between Samar, Dinagat, and Mindanao on the southeast, Bohol on the southwest, and Masbate on the northwest. It is elongated in shape, very irregular, and much wider on the north and south than at the center. It has a length of 160 kilometers from north to south, and is 75 kilometers wide at its broadest part. On the northern extremity of Leyte, forming with it a little channel, is the island of Gingantagan.. To the south of the bay of Ornoc lie the Camotes Islands, and near to the coast, and in front of Mount Sacripante, lies a group of four little islands. The eastern coast of Leyte is separated on the northeast from the island of Samar by the narrow strait of San Juanico, this island being almost united to it by a tongue of land, which forms the northwestern point of Leyte. To the east of the island is the island of Biliran, with which it forms a narrow channel of the same name. Toward the east exists the channel of Tanabatas in the west-northwest extremity of San Juanico, formed by the islands of Jabualla, Janabon, and Tanabaay.

To the north of the bay of Guinatungan lie the little islands of Cabugan. In the southeast the sharp point in which this island terminates forms, with the adjacent island of Panaon, the strait of this name and the port of Liloan. The interior of the island is mountainous, there being a number of craters of extinct volcanoes. In these

mountains are found large numbers of shells, which indicate that great physical disturbances have been suffered by this island. At one time the water dominated its mountains, and probably caused the separation of this land from Samar, with which it undoubtedly in ancient times was joined. The large valleys of the island are cultivated by the natives. There are two lakes, one called Bito, and the other, a small one, in the region of Jaro, to the north, this communicating with the sea through the Leyte River.

AREA AND INHABITANTS.

The province, including the adjacent islands, has an area of 9,976 square kilometers and 270,491 registered inhabitants.

LANGUAGE.

Visaya is the language spoken.

TOWNS.

The capital, Tacloban, is a beautiful town, situated at the entrance of the strait of San Juanico, on the bay of San Pedro and San Pablo. It is a well-known port. The town has some fine buildings, both public and private. Other towns of importance are: Abuyoc, with 9,534 inhabitants; Alanggalang, with 2,038; Albuera, Bato, Babatungan, Barugo, with 12,755; Baybay, Buranen, with 21,200; Cabalian, Capoocan, Cajaguaan, Carigara, 13,099; Caibiran, Dagami, with 12,220; Dulag, with 13,557; Hitongos, Hinunangan, Hindang, Inopacan, Jaro, with 10,422; Hinimdayan, Leyte, Ma-asim, Macrohon, Malibago, Malitbog, Maripipi, Matalom, Merida, Ormoc, Palos, with 18,297; Palompon, Pastrana, Quiot, San Isidro de Campo, San Miguel, Sogod Tananan, with 17,046; Tolosa, Tabonstabon, and Villaba.

PRODUCTS, INDUSTRIES, AND WAYS OF COMMUNICATION.

The mountains are covered with forests; from these are obtained pitch, honey, sugar, and many varieties of building woods. There are mines of gold, lead, and silver, and mines of sulphur. The exports of the island are important, among these being hemp of the value of $5,000,000, sugar of the value of $50,000, and chocolate, coffee, oil, corn, cattle, horses, and hogs to the value of $63,000. Wax, honey, bird's nests, shells, sponges, and pearls are exported in small quantities. The most important product is hemp, no other province being able to compete with Leyte, because its plantations have been under cultivation for forty years. These plantations require very little work, the crop being permanent, abundant, and of excellent quality. There are but four interior towns. The important ports are Tacloban and Carrigari on the east coast, and Ormoc, Baybay, Ilongos, Ma-asim, and Malitbog on the west coast. The land within the jurisdiction of the province is 572,000 hectares, of which 250,000 are under cultivation, the remainder of the land being mountain or grazing land. In some of the towns of the eastern coast the women are very skillful in the manufacture of fabrics and in embroidering. The eastern coast of Leyte has many good roads suitable for carriages at all times of the year. The western coast has but

few such, and others suitable for horses. Communication by sea is more frequent, as the large number of gulfs and bays, although they may cause breaks in the roads, furnish good interior waterways.

ADJACENT ISLANDS.

THE NORTH COAST.

Maripipi.—This, the most northern island, is a rounded mountain, covered with vegetation, and having an elevation of 911 meters above sea level.

Sambabuas.—These are small islands or rocks very close together and surrounded by a sandy shoal.

Balizan.—This important island lies to the extreme northwest of the island of Leyte, and has approximately a length of 20 miles from northwest to southeast and a breadth of 10 miles. It is mountainous, quite high, and in the north is seen the beginning of the small mountain chain which divides it longitudinally. The highest peak of this chain is in the western part. The most important towns are Almeria, Naval, and Bilizan on the western coast, and Caibizan on the eastern coast. There is a multitude of little villages along the coast. This island is noted for the sulphur springs in the mountains.

Calumpijan.—This little island lies about a mile from the shore, east of the sharp mountain peak called Pacduhuuan. The little islands of Polo and Calajit lie in the middle of the little channel formed by the island of Bilizan on the north coast of Negros.

THE WEST COAST.

Gigantangan.—This island lies 1½ miles from Point Taglanigan, northwest of Leyte, and is 2 miles long from north-northwest to south-southeast and 1 mile wide.

Calangaman.—This is a little island 7 miles west of Vantay. From Villaba to Ormoc nothing but very small islands and reefs are found.

Camotes.—This is the name given to some small islands which form a group united by little reefs. They are called Pacijan, Poro, and Poson, there being a little island to the north of Poicajon called Talong. They are situated to the north of the Bay of Ormoc and of Pozios, which is the most northern of the group, and 5½ miles from Point Catunangan, which forms a wide and deep pass. The islands are inhabited and have some small towns and villages.

Cuatro Islas group.—These are about the only islands found near the coast between Ormoc and Inopacan. The most northern of the islands is the smallest, and is called Duquio. The largest, south-southwest, is Mahabas; another, nearer the coast, Apit, and that farthest to the south, Himaquitan.

Canigao.—This is an island of little importance, and is about the only one found between Inopacan and Ma-asim.

THE SOUTH COAST.

Lamasana.—This island is situated 2 miles southeast of the southern point of Leyte, is long and narrow, 4½ miles from north to south and 1 mile in breadth. It has two little towns, San Bernado and Triana.

Pauaon.—This island is separated from the southeastern part of Leyte by the little strait of the same name; it is mountainous, long and narrow, and extends over 17½ miles from north-northwest to south-southeast. It is 5 miles wide in the northern part. The eastern coast has a picturesque appearance, presenting from time to time beautiful cascades and large numbers of little creeks. It is well populated, the principal towns being Silvan in the north and San Ricardo in the south. Gold is found near Point Pinutan.

There are no islands of importance on the eastern coast, except those already mentioned in connection with Samar.

CHAPTER X.

ISLANDS OF MINDANAO AND BASILAN.

[Maps Nos. 26, 27, and 28 of the Atlas of the Philippines.]

ISLAND OF MINDANAO IN GENERAL.

BOUNDARIES AND AREA.

The island of Mindanao, the most southern in all the archipelago, is situated between the parallels of latitude 5° 36′ and 9° 49′ north and longitude 125° 30′ and 130° east from Madrid. It is, next to Luzon, the largest island in the archipelago. According to the data of the Institute of Geography and Statistics, its area, including the small adjacent islands, is 99,450 square kilometers, which is a little less than that given by Fathers Buceta and Bravo in their dictionaries of the Philippines.

NUMBER OF INHABITANTS.

The population, according to the census of 1887, was 209,087, but this figure did not include the natives of the interior.

LANGUAGES.

The following languages are spoken: Spanish, somewhat corrupted; Moro and its dialects, Joloano, Samal, Yacam, Maguindanao, and the dialect of the coast of Davao, Visaya, Cebuano, and Bagobo, Tagacaolo, Bilan, Montes, Mamanna, Tiruray, Tagabili, and Dulangan.

TOWNS, VILLAGES, AND HAMLETS.

The great island of Mindanao is divided into seven districts, as follows: First, Zamboanga; second, Misamis; third, Surigao; fourth, Davao; fifth, Catobato; sixth, Basilan, and seventh, Lanao. Ecclesiastically, one part of it belongs to the bishopric of Jaro and the other to that of Cebu.

MOST IMPORTANT PRODUCTS OF THE ISLAND.

The mineral products of the island of Mindanao are not well known. For many years the natives have gathered some gold, which they present for exchange in the provinces of the north, where some experiments have been carried on. For many years the auriferous deposits of the district of Misamis have had great renown. According to Don Enrique Abella, the auriferous zone is situated between the Caturan River to the east and the Iligan River on the west, and along the beds of the Bulalacao Iparan, Cagayan, Bigaan, and Catman rivers. Coal deposits exist in the vicinity of Sibugney, Surigao, and Mati. Sul-

phur is plentiful in the vicinity of the various volcanoes of the island, and mineral waters are abundant at Catobato and other points.

On account of the excellent quality of the soil, the abundant rains, and the influence of the climate the entire island is covered with vegetation, generally by forests. Many kinds of wood are found in the forests, those useful for naval construction and building purposes being abundant; among these may be mentioned guijo, molave narra, ipil, malatumbaga, lanan, camagon, manconi or ironwood, camuning, mangasinoso, palo-maria, teak, pagatpat, mangachapuy, sibucao, bancal, etc., and other similar plants, such as grasses and the sun juniper, and some cypress and cogan or reed grass. The bamboo known as boja, rattan, and other trailers form impenetrable jungles. The cocoanut, the betel nut, the betel pepper, and bananas grow abundantly. Hemp is grown, and the chocolate and coffee bushes grow very luxuriantly and very rapidly. Other products are cabonegro, cotton, indigo, pineapple, sugar cane, rice, and tobacco. Cloves and nutmegs are found on the Bay of Sibuguey, where the cinnamon tree spontaneously grows. Corn, sweet potatoes, nami, ube, gabe, and analogous products grow abundantly in all districts, as well as all kinds of fruits, among them the delicious mangosteen. Gums and resins are obtained from the forests of the interior. In short, the vegetable wealth of Mindanao not only equals, but surpasses, that of Luzon and the Visayas, although, in truth, not so extensively exploited.

Nor is Mindanao behind the other islands in the animal kingdom. All kinds of monkeys are found in every part. There are large numbers of cattle, horses, and buffalos, the most of these being domesticated or owned by some known individual. Domestic hogs are found and wild hogs are more abundant, because the Mohammedan inhabitants do not use them. On the other hand, deer, which are found in all the forests, are much sought after. Many reptiles and insects, some of them poisonous, are found, such as snakes, scorpions; lizards, and large numbers of leeches are found in the rivers and on the trees. A large species of lizard, called the "iguana," sometimes reaches a length of 2 meters Snakes of the boa family attain extraordinary size. Crocodiles of large size are found in the rivers. A large variety of birds is found, the calao or horn bill being abundant in the forests. There are many varieties of pigeons and doves, among these being the so-called punalada, on account of a bright red spot which is on its breast. Parrots, cockatoos, jungle fowl, kingfishers, etc., are very numerous. Among animals should be mentioned monkeys and the caguang, an animal somewhat resembling a monkey and somewhat resembling a bat. Among the birds may be mentioned the salangana, which makes the valuable nests found in the caves of Mindanao and the adjacent islands.

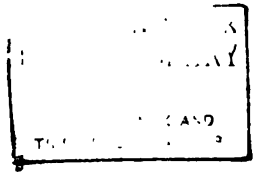
FIRST DISTRICT, OR PROVINCE OF ZAMBOANGA.

BOUNDARIES AND AREA.

This district is bounded on the north by Point Maraleg, in the province of Misamis; on the east by the district of Cottabato; on the south by the island of Basilan, and on the west by the sea of Celebes. It has an area of 29,846.96 square kilometers, the greater part of which is forest land, with the exception of the country around the capital town, where the inhabitants cultivate some rice.

PLATE XXXVI.

FORTRESS OF ZAMBOANGA.



Concerning the rest of the country but little is known, though it is supposed that in the region of Sibuguey, which has a population of 80,000, there are extensive areas of land under cultivation.

NUMBER OF INHABITANTS.

According to the general statistics of the bishopric of Jaro for 1897, there are 19,903 Christian inhabitants in Zamboanga and the surrounding towns, 8,000 Mohammedans, and in the unexplored region of Sibuguey there is a population of 90,000 pagan Subanos.

LANGUAGES.

The following languages are spoken: Spanish, Moro, Samal, Subano, and Chavacano (which is a mixture of Spanish), Tagalog, Visayan, and Moro.

TOWNS, VILLAGES, AND HAMLETS.

Zamboanga is the capital town of Mindanao. It is beautifully situated on an extensive plain covered with cocoanut groves and innumerable rice fields. Many of its buildings are of masonry, and others of boards, with galvanized zinc or nipa roofs. Prominent among these are the church and convent, the government house, the house of the governor of the district, and those of the naval commander and of the chief of engineers. The military hospital is a commodious and elegant building recently constructed. The Fortress of Pilar, with its strong stone walls, barracks, storehouses, etc., constructed under the direction of P. Melehoz de Vera, S. J., was of the greatest value during the invasions of piratical Moros in ancient times. The port, although open to the sea if the wind is from the south or southwest, is protected against the winds from the north and east; while in the river of Masinlog, 3 miles to the southeast, there is an anchorage protected against all winds. There is a beautiful quay, and a light-house of the sixth class (starry) showing a fixed red light. Belonging to the town of Zamboanga, which has a population of 7,634, are the villages of Santa Maria, Gusu, and Tipong, or San Roque. The towns belonging to this province are Tetuan, and the villages of Putig and Talontalon, with a population of 5,572; Mercedes, with the villages of Manicahan, Catumbal, and Boalan, with a population of 3,839; Bolong, with the villages of Curuan, Taguite, and Tamion, with a population of 1,144; and Iyala, with the villages of Talisayan, Erenas, or Malayal, with a population of 1,655, Sinonong, and the penal colony of San Ramon.

SECOND DISTRICT, OR PROVINCE OF MISAMIS.

BOUNDARIES AND AREA.

This district includes the northern part of Mindanao, the island of Camiguin, Silina, and various smaller islands. It is bounded on the north by the sea, which bathes the coast of Negros, Siquijor, and Bohol; on the south by the interior of Mindanao; on the east by the district of Surigao; and on the west by the district of Zamboanga. The coast line from the Marcielagos Islands to Point Dimata is 102 leagues in length. It has an area of about 1,136.95 square kilometers.

NUMBER OF INHABITANTS.

The population, according to the census of 1887, is 116,024, but considering the number of unknown villages in the interior it is probably much greater. According to the general statistics of the bishopric of Cebu, published in 1897, the number of inhabitants in this district is 169,256.

LANGUAGES.

The languages are Visaya-Cebuano, Montes, and Malay-Moro.

TOWNS, VILLAGES, AND HAMLETS.

The capital town is Cagayan de Misamis, which, with the adjoining village of Gura, has a population of 11,029. It is situated on level land on the bank of the river of the same name. Its public buildings, and some of the private buildings, are well constructed. The towns of this district are Tagoloan, with a population of 8,498, and with the village of Agusan, situated on the northern coast on the Bay of Macajalar, or Macabalan; San Martin, Minsoro, Malitbog, Pamploma, Siloo, Santa Ana, Jasaan, which, with the villages of Canajanan, Solana, Villanueva, Patrocinio, Claveria, and Bubuntigan, have a population of 4,564; and Baliñgasag, with the villages of Casulag, Canal, San Roque, Rosario, Lagonlong, Salay, and Concepcion, has a population of 9,330. Talisayan has a population of 5,877, and adjoining it the hamlets of Balinguan, Quinugeritan, Santa Inez, San Miguel, and Portolin. Gingoog has a population of 4,615, and adjoining it the hamlets of Medina, Minlagas, Odyungan, Linugus, San Juan, Consuelo, San Roque, and Asturias. Other towns are Guinsilitan, Sagay, Catarman, Manbajao, Mahinog, Iponan, Opol, Molugan, Salvador, with a population of 6,640; Alubijid, Initao, Naanan, Iligan, with a population of 2,466; and Misamis, with a population of 6,313. The latter town is situated on the west shore of the Bay of Panguil, having an anchorage included between Point Fuerte, on the north, and Point Pubut, the eastern termination of Mount Bucayan, which is situated 1 mile southwest of Point Fuerte. It is a land-locked port, protected against wind and sea. It is suitable for all kinds of shipping, and all kinds of boats can tie up close to the shore in front of the old town, a single plank serving to make connection with the land. For a distance of 8 miles the bottom is sandy. The town is situated on the northern side of the port on a little tongue of land cut by a canal, which empties to the northwest of the fort. Other towns are Loculan, Jiminez, Aloran, Oroquieta, with a population of 12,200; Layanan, Langaran, with a population of 12,219; Baliangao, and Sumilao, with a population of 4,122. There are also the hamlets of Tagmalusag, Calipayan, Sancanan, Tanculan, Balao, Guilabong, San Juan, Maluco, Impasugong, and Silipon, the town of Sevilla, with a population of 4,145, and the hamlets of Calasungay, Linabao, Bugcaon, Valencia, Covadonga, Monserrat, Oroquieta, and Silay.

Pertaining to this district is the comandancia of Dapitan, which is bounded on the north by the Visayan Sea, on the east by Misamis, on the south by Zamboanga, and on the west also by the Visaya Sea. It has an area of about 1,056 square kilometers. Among its towns are Dapitan, the capital, with a population of 7,627, having as adjacent

TOWN OF AYALA (ZAMBOANGA).

villages La Conquista, Barcelona, Dampolan, Ilaya, and Libay; Dipolog, with a population of 5,090, with its dependent villages Polanco and Sianib; and Lubungan, having a population of 4,556, and the dependent villages of Duhinop, Langitian, Manocan, Matan, Miatan, Labao, Toocaan, and Sera.

THIRD DISTRICT, OR PROVINCE OF SURIGAO.

BOUNDARIES AND AREA.

This province is situated in the northeastern and eastern part of the province of Mindanao, and includes the islands of Bucas, Binagat, Ginatuan, Gipdo, Siargao, Sibunga, and various small islands. It is bounded on the north by the strait of Surigao, on the east by the ocean, on the south by the district of Davao, and on the west by the district of Misamis. It is 124.25 kilometers in length from north to south and 97.98 kilometers in breadth from east to west in its widest part, its area being, according to official figures, 1,070,190 hectares, of which less than 10,000 are under cultivation.

NUMBER OF INHABITANTS.

The official census of 1887 gives a population of 67,760; the official guide for 1898, 85,125. According to the official statistics of the Bishopric of Cebu, published in 1897, the number of inhabitants in this district reaches 113,105.

LANGUAGES.

The languages are Visaya, Mamama, Manobo, and Mandaya.

TOWNS, VILLAGES, AND HAMLETS.

The capital town, Surigao, with the village of Ananaon, has a population of 9,254. It is situated on the right bank of the river in the extreme northern part of the island of Mindanao, four miles southeast of Point Bilaa. This district, until 1858 called Caraga, was the site of the first Spanish mission in these islands. The important towns in this district, not enumerating small villages, are: Dinagat, with 6,228 inhabitants; Cantilan, with 12,240; Placer and Taganaan, with 4,713; Gigaquit, with 9,997; Numancia, with 4,328; Cabuntog, with 5,129; Tanday, with 8,345; Lianga, with 5,350; Bislig, with 7,217; La Esperanza, with 2,460; Talacogon, with 3,560; Prosperidad, with 3,144; Veruela, with 4,597; Tativa, with 1,343, and Maynit, with a population of 4,607. Pertaining to this district is the comandancia of Butuan, situated on the bay of the same name in the northern part of Mindanao, and bounded on the north by the bay and district of Surigao, on the east and south by the aforesaid point, and on the west by the district of Misamis. It is one of the finest districts, and has a population of 12,013. In 1872 a monument of Hernando de Magallanes was erected to commemorate the place where the first mass was said in the Philippines. It is of stone, in two parts, and surmounted by a truncated pyramid. The inscription is in gold letters on an Italian marble slab. Besides Maynit and its villages, all of the towns and villages situated on the banks of the river Agusan belong to this comandancia.

FOURTH DISTRICT, OR PROVINCE OF DAVAO.

BOUNDARIES AND AREA.

This district or province is situated in the southeastern part of Mindanoa. It occupies the territory formerly known as Nueva Guipuzcoa, and extends from the Bay of Mayo, on the Pacific Ocean, to Point Malaluna, near the Gulf of Tuna, on the south coast of Mindanao. It is bounded on the north by the district of Surigao, on the south by Cottabato, between these two being Lake Buluan and the country called Boayen, or Buhayen; and on the southeast by the Pacific Ocean, where the port of Balete and the Bay of Pujaga are found. The islands of Samal, Talicud, Pujaga, Saranginas, Sirangan, Moleron, Limbal, and the little islands of Malipano and Sigaboy belong to this district. The distance from Point Tagobon, south of the Bay of Mayo, to Cape San Augustin is 48.23 kilometers; from the center of the bay northwest to the town of Rosario, at the mouth of the River Hijo, 102.09 kilometers, and from this town to Point Sarangani, on the east coast of the district, 161.53 kilometers. The widest part of the western coast from Point Gorda to the interior is 57.70 kilometers.

NUMBER OF INHABITANTS.

Although this is a very fertile district it has but few inhabitants, the official census of 1897 giving 3,966. According to the official register of the Bishopric of Jaro, to which this district belongs, and which was published in 1895, the population, excluding Caraga, Catel, and Bazanga, was 4,810.

LANGUAGES.

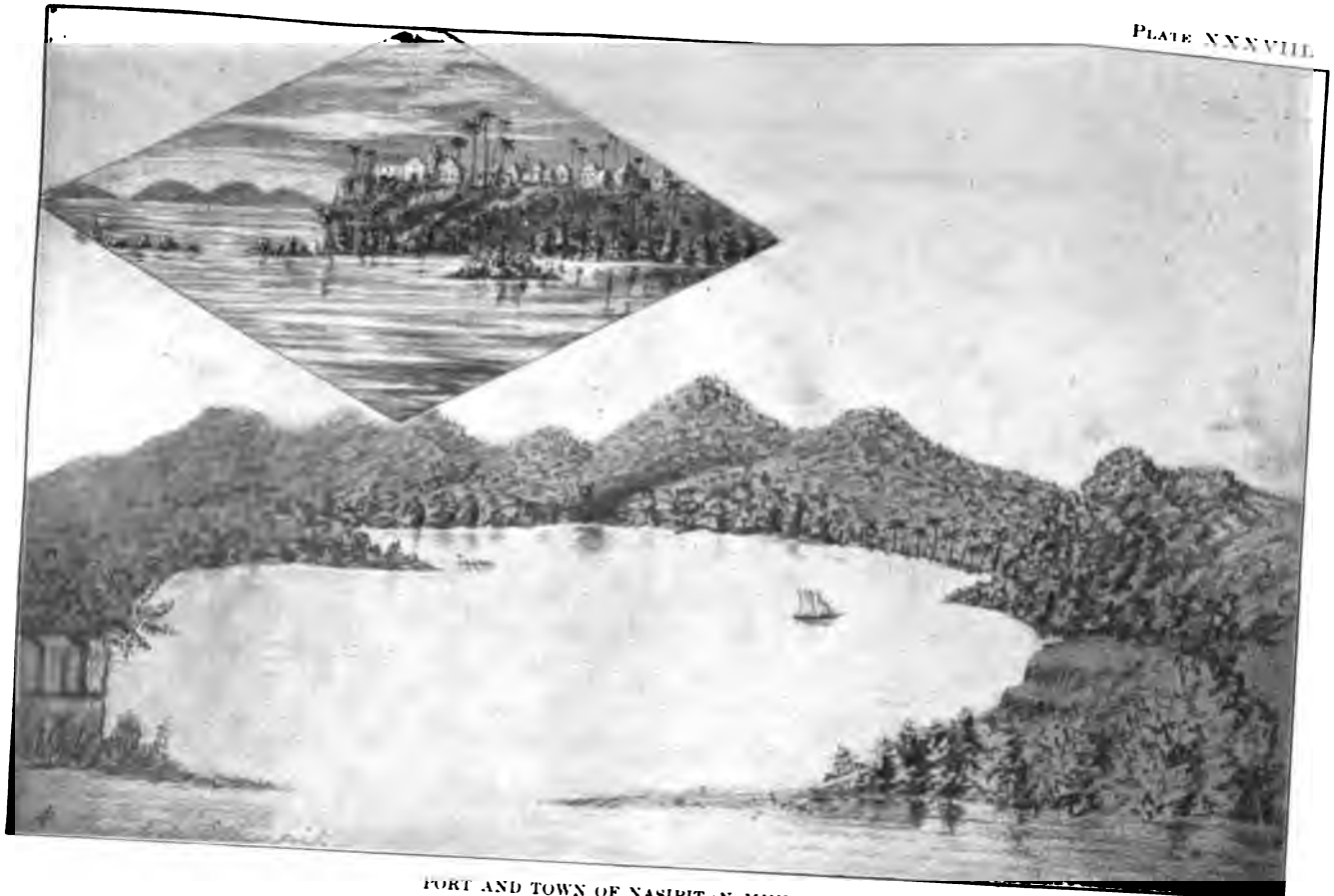
The languages are Bisaya, Bagobo, Guianga, Tagabana, Tagacaolo, Ata, Calagan, Manobo, Moro, Tagabili, Bilan, and Sanguil.

TOWNS, VILLAGES, AND HAMLETS.

The town of Davao, the capital, has broad, well laid-out streets. The parish house is one of the best in Mindanao. There are many other large, well-built houses. Santa Cruz and Malalae are situated on one of the finest ports in the archipelago. It is of good depth, sheltered from all winds, and easy of entrance even in bad weather.

Among the principal towns of this district are Davao, the capital, with a population of 13,874, which has a large number of small towns dependent upon it, and Peñaplata, with a population of 1,848, which also includes a large number of small hamlets.

Pertaining to this district is the comandancia of Mati, which has the largest area of any in the archipelago, 9,034 square kilometers. The principal towns are Mati, with a population of 2,475; Sigaboy, with a population of 2,217; Caraga, with a population of 4,054; Nanay, with a population of 2,649, and Cateel, with a population of 6,561. There is a large number of small villages and hamlets.



FORT AND TOWN OF NASIPIT (N. MINDANAO).

TOWN OF ALBERIQUE (DAVAÓ).
Town of Moros, recently converted.

WHARF OF MATI (MINDANAO).

THE FIFTH DISTRICT OR PROVINCE OF COTTABATO.

BOUNDARIES AND AREA.

This district is bounded on the north by the great mountain ranges, which separate it from Misamis and Surigao; on the east by the Bay of Ilana and Zamboanga from Point Fleches; in the interior by the district of Davao, and on the south and west by the Sea of Celebes. As the interior of this province is almost entirely unknown, it is almost impossible to determine its exact area. It is estimated to be about 28,293.97 square kilometers.

NUMBER OF INHABITANTS.

The census of 1887 gives a population of 4,148, and the records of the diocese of Jaro, published in 1895, of but 3,014.

LANGUAGES.

The languages spoken are Spanish, Moro-Maguindanao, Tiruray, Dulangan, Manobo, Ata, Bilan, and Tagabili.

TOWNS, VILLAGES, AND HAMLETS.

Cottabato, the capital, has a population of 1,012. It is situated on the left bank of the Pulangui, or Rio Grande, whose banks are inhabited by Moros. There is a magnificent fort, or castle, situated on the hill, and here is established a semaphore for the guidance of boats crossing the bar at the entrance. Part of the town is flooded during high tide. The commerce is in the hands of a large number of Chinese, who have established themselves here. Polloc, with a population of 472, is situated on the south coast, east of the great bay of Illana. Its port is well sheltered, clean, and deep, and although open on the west, it is protected by the island of Bongos, which lies just in front of the entrance. It is a military comandancia, belonging to Cottabato, and has a naval station established in the aforesaid town. It has a dry dock for the use of gunboats. At Tamontaca, which has a population of 2,420, there is an orphan asylum for Moro children, under the care of the Jesuit priests. In the bay of Illana there is a military station at Parang-parang, on the other side of the bay of Polloc. The forts of Malabang, Baras, and Tucusan are under the command of the chief military officer of Parang-parang. A military hospital, and a supply depot are located at Parang-parang. There is a fort, and a fine church of gothic architecture. The town is abundantly supplied with clear, cool water. The notable Reina Regente fort is situated in the center of the Moro country. (See Pls. XLVI, XLVII, and XLVIII.) At Point Pola, within the jurisdiction of Cottabato, is the military station of Lebac, established to restrain piracy, and the insolence of the Moros. (See Pl. XLIX.)

SIXTH DISTRICT OR PROVINCE OF BASILAN AND ADJACENT ISLANDS.

BOUNDARIES AND AREA.

The beautiful island of Basilan is situated in the extreme southern part of the Philippine Archipelago. It is bounded on the north by

the strait of Basilan, on the south and west by the sea of Jolo, and on the east by the sea of Celebes. It is 12 leagues long from east to west and 8 broad from north to south.

NUMBER OF INHABITANTS.

The official census gives a population of 1,119; the records of the bishopric of Jaro for 1895, 1,424.

LANGUAGES.

In the capital town Spanish is spoken, the natives using their own languages, Moro, Samal, and Moro-Jacan.

TOWNS, VILLAGES, AND HAMLETS.

The capital town is Isabela. At the naval station there is a dry dock for gunboats, a crane capable of lifting 20 tons, carpenter and iron shops, an iron and bronze foundry, a magazine, and machinery worked by steam. The port is a beautiful strait, 3½ miles long, having an average width of 600 meters, and is formed by the islands of Basilan and Malamaui. It is capable of sheltering a good-sized fleet. On the island of Malamaui, in front of the quay, is a large coaling station, which is used by all of the ships of the naval division of the south. A small stream called the Chorrillo furnishes an abundance of cool, healthful water, which is carried to the station by a pipe. At the most strategic point of the town there is a fort called Isabel II. It is composed of 4 bulwarks, occupying the 4 angles, and is entirely surrounded by a moat. This fort not only dominates the narrow channel, but serves as a defense against the Moros, who might come down from the mountains or along the river Pasajan. The Navy has a hospital situated at the mouth of the Pasajan, just in front of the station. (See Pl. LXI.) Six small villages are included in the town of Isabela. The Pilas Islands, situated to the west of Basilan, are the following: Pilas, Mamangat, Balug, Calug, Sangboy, Tinga, Mataja, Dasalan, Caludlud, Cujangan, Palajanjan, Minis, Mamanac, and Pasig-Posilan. Other adjacent islands are: Bubuan, Salupin, Lalanan, Tapiantana, and Buentua.

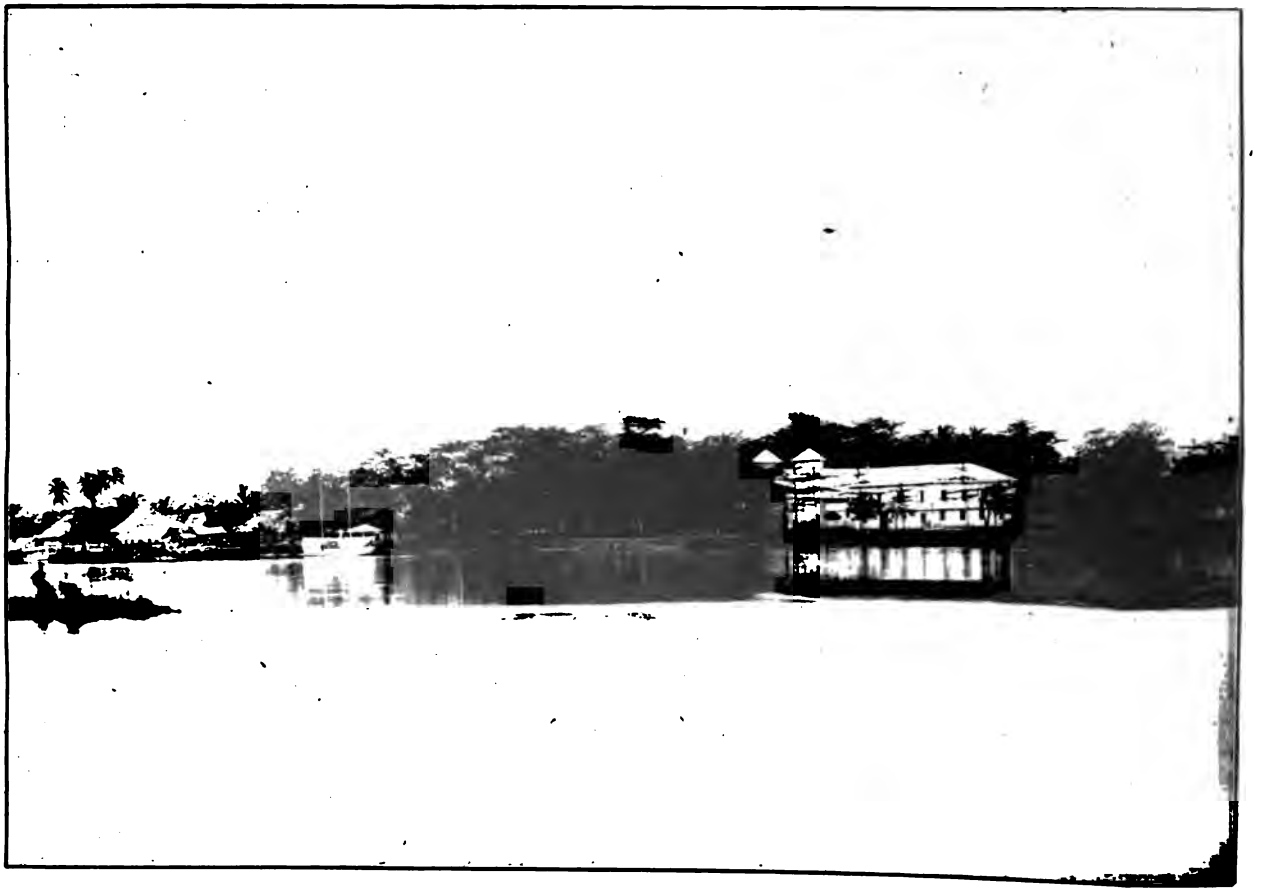
SEVENTH DISTRICT OR PROVINCE OF LANAO.

BOUNDARIES AND AREA.

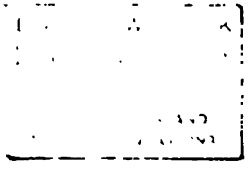
This district includes all of the territory of Lanao, extending on the north as far as Lumbayanequi, and on the south as far as the watershed between the laguna and the bay of Illana.

NUMBER OF INHABITANTS.

As this district has been but recently created, and as it has not been completely dominated by Spanish arms, it has not been possible to form towns nor to take a census of its inhabitants, the floating population being composed of those in camp. There are large numbers of pagan Moros, of the Malanaoc tribe, the town of Bato alone having a population of 4,000. All of the inhabitants of the towns and villages about the lake number more than 100,000.

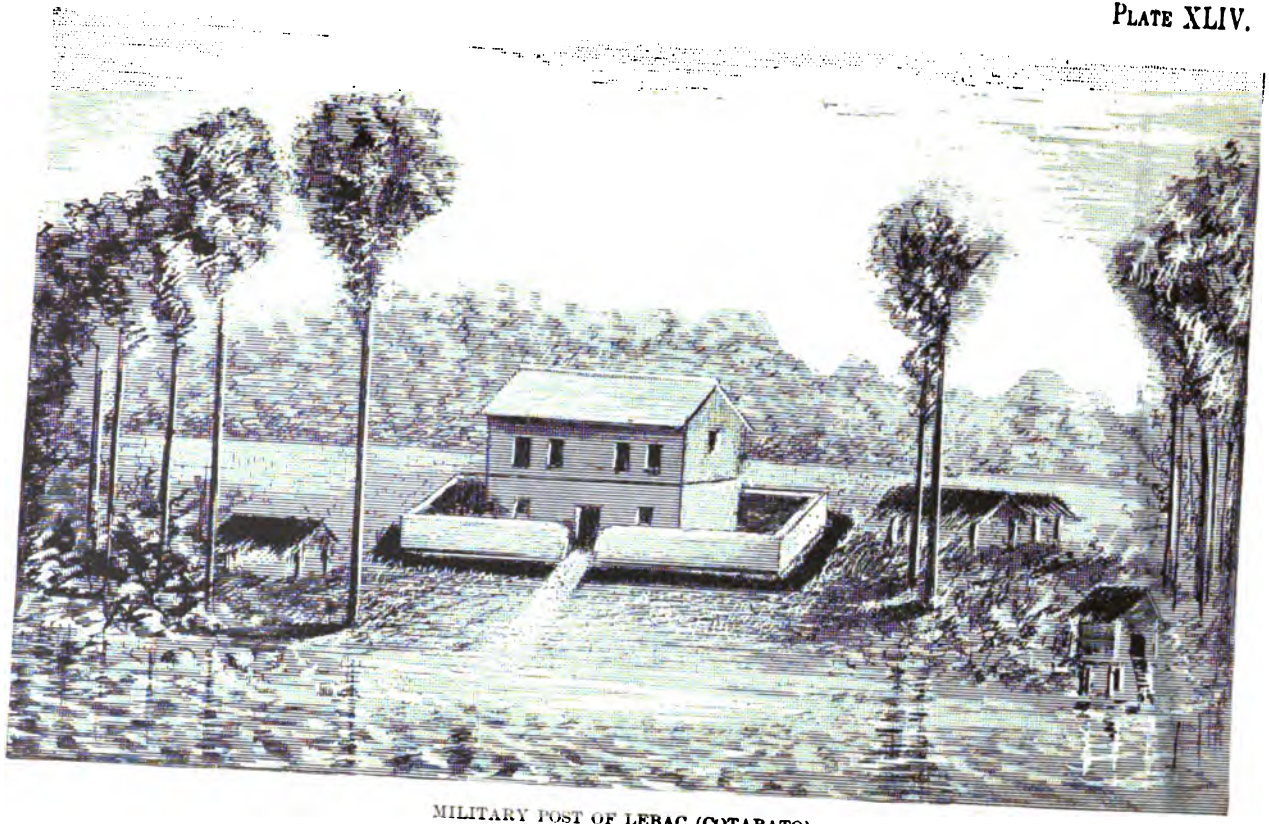


COTABATO (MINDANAO).

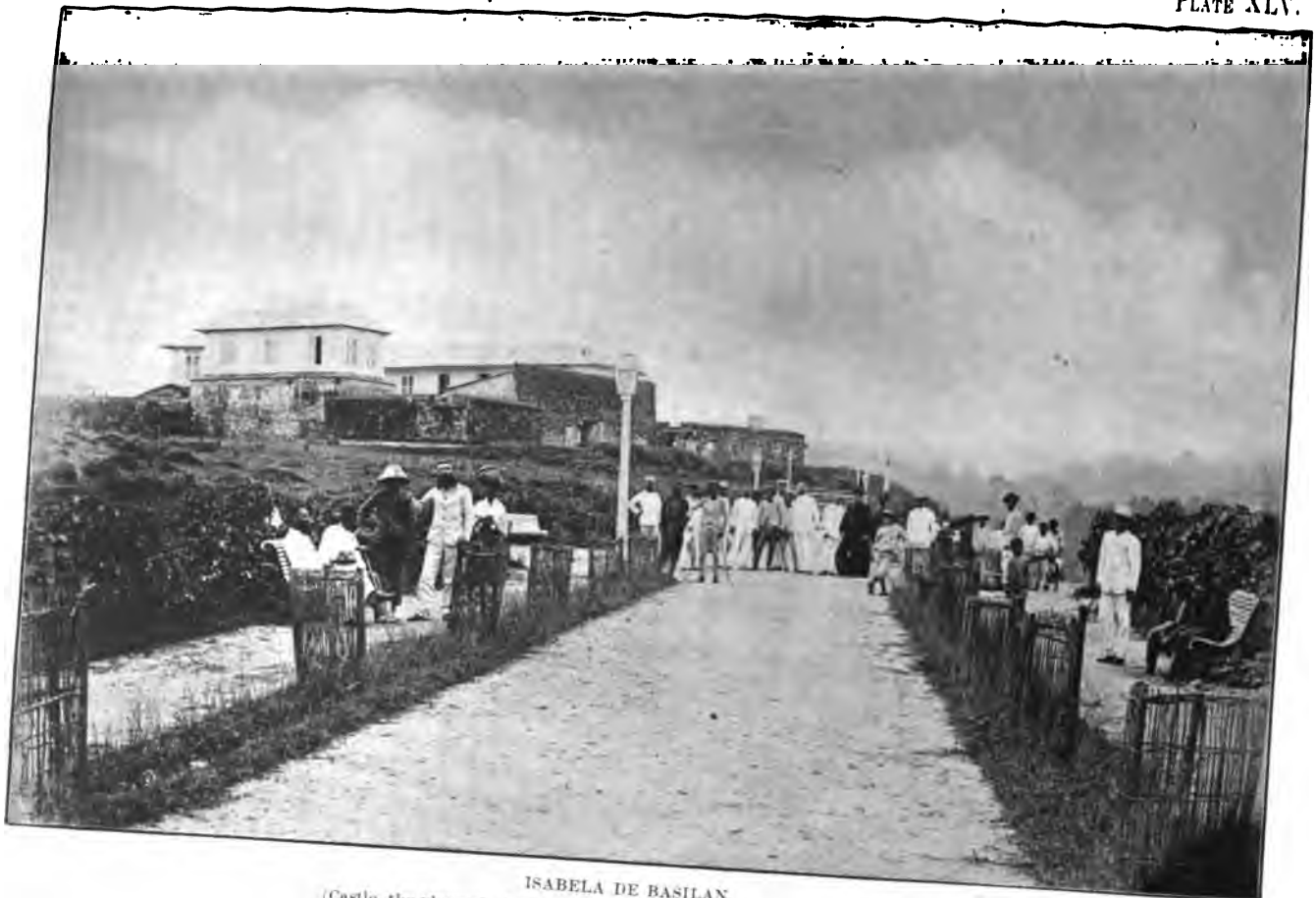


FORT OF THE QUEEN REGENT, ON THE RIVER PULANGUI (INTERIOR OF MINDANAO).

FORT OF THE QUEEN REGENT.
On banks of the Pulangui (33 miles from the sea).

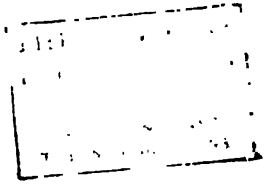


MILITARY POST OF LEBAC (COTABATO).



ISABELA DE BASILAN.
(Castle, the plans of which received prizes at the Philadelphia Exposition.)

NAVAL HOSPITAL OF ISABELA OF BASILAN.



LANGUAGES.

The language spoken in this district is Moro, of the Melanao dialects.

TOWNS, VILLAGES, AND HAMLETS.

There are no organized towns or villages—only garrisons and forts—the principal of these being Marahui. The most noticeable feature of this district is the lake from which it has taken its name—Lanoa. The extreme northern part of this lake lies at about the eighth degree of north latitude, and the center about 124° 19′ east longitude from Greenwich—that is to say, about the meridian of Iligan. It is therefore in the eastern and widest part of the isthmus, which separates the bays of Iligan and Illana. The principal Moro towns on the lake are Ganasi and Taraca, on the eastern shore. The lake is quite deep, in some places from 3 to 5 fathoms. The lake is about 8 leagues in length and contains 6 islands, on the larger of which—Nuza—there are more than 500 houses. The lake is surrounded by towns and little villages, these being more than 60 in number. The lake empties by a waterfall into the river Iligan.

THE ISLANDS ADJACENT TO MINDANAO.

Something has already been said of the adjacent islands, particularly of the most important one Basilan. Others of some importance are on the south coast.

THE PANUBIGAN GROUP.

Olutanga.—This island forms, with the coast of Mindanao, a channel which connects the bays of Sibuguey and Dumanquilas.

Quidabun Group.—This group is composed of the islands of Muda, Bacula, and Baya.

Ticala and Sagarayan.—These islands are situated south of the point north of the bay of Dinas.

Bongo.—This island is situated in front of the port of Polloc, its northern extremity being 4½ miles to the west-southwest of Point Tugapangan. It is covered with forests and is rather low. It is not inhabited.

Timaco.—This island is formed of a hill entirely covered with forests, the trees reaching to the water. It is situated at the mouth of the Rio Grande, scarcely a mile to the south. This hill of Timaco and that of Pico, Cogonal, more to the south, serve as excellent landmarks to the mouth of the river.

Sarangani.—This is the name given to two islands and a little isle situated 6 miles south of the point of Mindanao. The natives call the larger one Balut-marila and the smaller one Balut-parida. Balut-marila, which is quite high and covered with vegetation, is inhabited by a considerable number of Sanguiles and Bilanes. In the center of the island is a volcano, from which smoke occasionally rises.

In the interior of the bay of Davao is found the island of Tres Arbores, near the mouth of the river Hijo; the islands of Pandasan and Copiat; the Cruz Islands, near the coast of Samar; the island of Sigaboy and the island of Samar, the largest and most important, which has a perimeter of 42 miles. The land is quite fertile and pro-

duces excellent chocolate, which, if cultivated on a large scale, would prove a source of great wealth. The principal towns are situated on the western coast.

Malipano is a picturesque little island to the east of Samar.

Talicut, or Guisoc, is situated to the southwest of Samar. It is low and covered with forests, having some marshy spots, and is uninhabited, as no fresh water is to be found. According to the Samales, excellent tobacco can be raised there.

On the east coast:

PUJAGA.

This is a little island situated at the entrance of the bay of this name, in front of the town of Mati.

OANIOAN.

To the south-southwest of Point Batiano is a little semicircular island with this expressive name. From Point Cauit there is no island of importance. Davis lies in front of the bay of Bislig. Arangasa lies just beyond the bay of Lianga, and Macangoni and other little islands to the northeast of Tandag.

Beyond Point Cauit, northeast of the peninsula of Surigao, are several larger and more important islands.

On the north coast:

SULUAN, OR BUENA SEÑAL.

This island lies 10 miles south, 38 degrees east of the southern point of Samar. It is a little island about a mile long, rather elevated, and quite bold in outline.

MALHON.

This island is situated 9 miles west of the southern point of Samar, and is also called Tomonjol. It is irregular in outline and of but slight elevation.

DINAGAT.

This island is situated north of the northern point of Mindanao, from which it is separated by a narrow channel. It is long and narrow, and extends 36½ miles from north to south from Point Desolacion to the point south of Gabo, and is 12½ miles in greatest breadth. It is traversed by a little mountain chain, and is well settled along the coasts. Above the point south of Dinagat, and very close to the western part, there are two islands, from 5 to 6½ miles long, separated from each other and from the main island by two narrow channels. The inhabitants of Dinagat are occupied in the collection of gold and also in the collection of natural products, such as wax, honey, etc.

GIPDO.

This narrow island, having an altitude of 314 meters, is situated 5 miles southwest of the point near the town of Dinagat.

SIMILON.

This island is situated 3½ miles east of the northern extremity of Gipdo, and 5½ miles north of Point Bilaa.

UNIP GROUP.

In front of the bay which opens southwest of the island of Dinagat lies the Onip Group, composed of Sibanag, Unip, Tabucaya, and various smaller islands.

GIBUSON.

The northern coast of this island is about 9½ miles west of Point Desolacion.

SIARGAO.

This island is southeast of Dinagat, to which it seems to be united by a submerged bank. It lies 16 miles north of the nearest coast of Mindanao, is irregular in outline, and 18 miles long from north to south. A little mountain chain runs from north to south. There are various small towns and little ports. About Siargao are various small islands and isles, all of little importance, with the exception of the Bucas Group. This is situated south-southwest of Siargao, and is composed of three small islands lying close together. To the west-northwest of this group is Guinatuan and the island of Cabusuan to the south of it.

CAMIGUIN (PLATE LXIII).

This island lies 5½ miles north of Point Bagacay, and has a length of 12 miles from north to south, and a breadth of 8 miles from east to west, being very mountainous and rugged. It is formed of a central mountain which reaches an altitude of 1,627 meters above sea level. The island produces rice, good tobacco, wax, and chocolate in abundance. It has a population of 24,122, most of them engaged in agriculture or fishing. Along the rest of the coast from Point Bagacay to Point Gorda only shoals and little islands are found. Two, however, are worth mentioning: Sipaca, a little island formed by a conical mountain, and the island of Lapinag, which forms channels with the coast and which is very picturesque. (See Plate LXIV.)

TICTIRAN.

This island is situated almost east of the southern point of Zamboanga, and extends from east-northeast to west-southwest a distance of 2¼ miles. It is low, covered with vegetation, and bordered on the southwest, south, and east by coral reefs.

SACOL.

This island lies a short distance northeast of the preceding, and extends for 7 miles from northwest to southeast, being widest and highest at the northern end.

TUMALUTAN AND SINONOG.

These islands are 3½ and 2¾ miles, respectively, from the northeastern extremity of Sacol. They are quite small, the former being quite elevated.

MALINIPA.

This island is situated south of Sacol and north of the eastern entrance of the strait of Basilan.

ISLANDS ADJACENT TO ISABELA DE BASILAN.

That which is called the Basilan Group is composed of various islands, the most of them scattered over the region south and west of Isabela. The principal ones are as follows:

TEINGA.

This is the most northern island of the group; lies 18 miles northwest of Basilan, and is small, low, and covered with trees.

TAPCANTANA.

This is the most southern of the group and lies south of the most southern point of Basilan.

PILAS.

This is the largest of the islands adjacent to Basilan, and has a considerable number of Moro inhabitants, as do all the important islands of this group. West of Pilas there are various small islands, which form with it good anchorages.

OREJAS DE LIEBRE, OR SANGBOIS.

These islands are 3 miles south-southwest of Teinga, and have an elevation of 178 and 256 meters, respectively. The islands are quite notable, especially the mountain on the southern island. This appears like a cupola, from which the flat lands extend.

TAMUC.

This island rises in front of the western coast of Basilan, northwest of Tatcantana.

BUBUAN.

This island is situated north of Tatcantana, and is very similar to it.

MALAMAUI.

This island is very near the north coast of Basilan, with which it forms an excellent anchorage suitable for large ships. It lies in front of the town of Isabela, and forms with the coast of Basilan the famous strait of Isabela.

CHAPTER XI.

THE ARCHIPELAGO OF JOLO AND THE ISLANDS OF PARAGUA, BALABAC, AND CAGAYAN DE JOLO.

[Maps Nos. 26 and 28 of the Atlas of the Philippines.]

THE ARCHIPELAGO OF JOLO.

BOUNDARIES AND AREA.

Authors have not been entirely in accord in regard to the boundaries and area of the Archipelago of Jolo. The Derrotero del Archipielago Filipino (Nautical Guide to the Philippines) considers as belonging to it the long chain of islands which extends for 180 miles and divides it into three principal groups—Basilan on the east, Jolo in the center, and Tawi Tawi on the west. The official guide, following Antonio Garin, limits the group to the islands lying between Balanan, in longitude 121° 52′ east of Greenwich, and Tumindo, on the west, lying 119° 15′ east of Greenwich. This excludes the island of Basilan and its adjacent islands, including in the archipelago those islands lying between the parallels of 4° 30′ and 6° 25′ north latitude. This seems to be the most acceptable boundary, although in reality Basilan and its adjacent islands form a separate province of the Jolo Archipelago. The seas bathing the coasts of the Jolo Archipelago are those of Jolo or Mindoro on the north and Celebes on the south. The islands constituting the Archipelago of Jolo may be divided into four groups.

FIRST GROUP.

The Balanguingi Group is situated between the parallels of latitude 5° 59′ and 6° 17′ north, and longitude 121° 29′ and 121° 51′ east from Greenwich. It is composed of eighteen islands, of which seven are of medium size and the rest only isles. The most northern are Balauan and Buartia, which are separated from each other by a very narrow channel. To the east are the two islands called Dipsilut, which has close to it the little isle of Mamud, and Tonguil. To the southwest are the islands of Mamanoc, Tarol, Tuncolan, Sipal, and the principal island Balanguingi, the famous pirate resort. Between this island and the eastern extremity of Jolo are the little islands of Bongao and Limiza.

SECOND GROUP.

The Jolo Group is situated between the parallels of latitude 5° 46′ and 6° 14′ north, and longitude 120° 50′ and 121° 17′ east from Greenwich. The principal island is Jolo. North of the eastern extremity of Jolo is Capual, with an area of 20 square kilometers, and Bitinan. To the northeast lies the low level island of Tulayan, which forms with the coast of Jolo the port of this name. Farther to the west lie Gujanjan and various small isles. North of the anchorage of Jolo lie

the island of Tulian and the group composed of the islands of Pangasinan, Marongas, Cabmuan, Bubuan, Hegad, Mimo, Pantocunan, and Termabal. The islands of Salude, Termabal, Patian, Lumbian, and Pata, with an area of 58 square kilometers, lie to the south.

THIRD GROUP.

The Tapul Group lies between the parallels of latitude 5° 24′ and 5° 46′ north, and longitude 120° 16′ and 120° 4′ east from Greenwich. It is composed of the islands of Tapul, with an area of 34 square kilometers and circumference of 23 kilometers; Lugus, a low island covered with trees and having an area of 51 square kilometers; the Cobingan Islands; Siassi, the most important of the group, covered with forests and with an area of 82 square kilometers; Lapac, very similar to Lugus in size and shape; Tara, Lamenusa, Selim, Manubot, and Tapaan.

FOURTH GROUP.

The Tawi Tawi Group lies between the parallels of latitude 4° 47′ and 5° 29′ north, and longitude 119° 43′ and 123° 33′ east from Greenwich. It includes, besides the island of Tawi Tawi, about forty others, of which fourteen are of some size. Tawi Tawi is situated about 50 kilometers southeast of the peninsula of Usang, on the island of Borneo. It extends from east-northeast to west-southwest for a distance of 55 kilometers, and is about 25 kilometers wide at the broadest part near the eastern end. The general appearance of the island is much varied, there appearing among masses of clear green a multitude of groves with trees close together or widely separated.

The islands bordering it are but little inhabited, and in inaccessible corners in them the most incorrigible pirates have their hiding places.

Among other islands may be mentioned Manicolat, Bubuan, Cinatusan, Cacataan, Sigboye, Tambagan, Basbas, Panjumojan, Tabulunga, Daluman, Tancan, Tandubato, Tarue, Simaluk, Luran, Banaran, Bilatan, Simonos, Manue, Manca, Laa, Sanga-Sanga, Buan, Sibutu, Tuul, Usada, Cunilan, Pangutarang, Panducan, Laparan, Bilanguan, Bambanan, Mamanuk, and the small group of islands of Tataan, which extend for 8 miles from northeast to southwest almost parallel to and at a distance of 1½ miles from the coast north of Tawi Tawi.

Among the principal ports of the Archipelago of Jolo may be mentioned Jolo, between points Dinangapit and Belan on the northwest, which has a depth of 18 to 20 fathoms, Luban, on the southeast; Punungan, on the southwest, south of Cabunant on the southern part of Lubbac; Itua, on the north of this island; the anchorage of Carondong, and the Bay of Patogo, between Sang and Point Tandican, on the southeast of the island. On the northwestern coast is the island of Kapual, with which it forms a narrow strait.

NUMBER OF INHABITANTS.

According to the official guide of the Philippines for 1897 the population of this archipelago is 22,630, but considering how little is known of many of the islands, and of the population of innumerable little villages on them, this number is probably only approximate. According to Ferreiro the number of men in the various groups of islands

STREET IN JOLO.

PRINCIPAL HOUSE IN JOLO.

governed by Datos or Panlimanes, serviceable for war, is, in Balanguingui, 335; Jolo, 14,415; Tapul, 1,300; Tawi Tawi and Pangutaran, 1,815, making a total of 17,865. It would therefore seem reasonable to suppose that the population is not less than 200,000 in all the archipelago. According to the general registry of the diocese of Jaro, published in 1895, there are 1,424 Christians.

Four races having different customs may be distinguished in the archipelago: First, the Quinbajanos, or inhabitants of the mountains, who are the indigenes; second the Malay and Visayan slaves, whose descendents have intermarried with the other inhabitants; third, the the Samales, an inferior race, though not slaves; and fourth, the true Moros, who trace their origin from the Mohammedan invaders, and who dominate the other inhabitants.

LANGUAGES.

The languages of the inhabitants are Moro-Joloano and Moro-Samal, the latter containing many Visayan words.

TOWNS, VILLAGES, AND PARISHES.

The points occupied by the Spaniards are Jolo and the military garrisons of Siassi, Bongao (Tawi Tawi), and Tataan.

Jolo, situated on the island of this name, was the ancient residence of the sultans. It has wide, straight, and well-shaded streets, being without doubt the cleanest town in the archipelago. The houses are all painted or whitewashed on the outside, not one having the nipa roof so common in the rest of the archipelago. It has a large hospital and a good barracks for infantry. There are beaches and gardens, and a water supply to both private and public buildings. Its newly constructed market is of fair size and well arranged for the large number of neighboring Moros, who come here with fruits and other merchandise. A brick wall surrounds the town, thus making it a fortified place. The defenses, Alfonso XII blockhouse and Puerta Espagna, and the forts of Torre de la Reina and Princesa de Asturias on the neighboring hill, serve for offensive and defensive purposes. On account of being a free port it is in direct communication with Singapore by means of two English steamers, each one of which makes a round trip every twenty-eight days, and it is likewise in communication with Manila by means of the bimonthly mail steamers. A stone pier, extending for a considerable distance out, facilitates loading and unloading. On this pier is a light-house of the sixth class, with a fixed red light. Pertaining to Jolo are the three garrisons already mentioned, which are constituted in the form of politico-military comandancias. Jolo belongs to the bishopric of Jaro. There is a missionary priest there who has charge of the villages of Siassi, Tataan, and Bongao.

IMPORTANT PRODUCTS.

The flora of this archipelago is similar to that of Mindanao. There is an abundance of teak, camuning, molava, narra, mangachapuy, ipil, cedro, palohierro, and other equally prized woods, as well as cocoanut groves, the cabonegro, buri and nipa palms. Gum mastic, all kinds of

resins, and other analogous products are found. Rice, corn, hemp, saffron, indigo, sesamo, cotton, the magosteen, the jack fruit, etc., are all produced. Coffee and chocolate grow well on the shaded hillsides, and hemp grows without cultivation on the lowlands. Horses, cattle, buffaloes, and goats are abundant. Many species of birds are found. The Jolo people manufacture chisels (patu), long knives with sharp edges and points (lagut), ordinary hatchets (capa), and gauges (licut).

The pearl fisheries are very important in this archipelago, although of greater importance on account of their intrinsic value, greater abundance, and better market are the conch shells (mother-of-pearl), which sell well in the markets of Singapore and Manila.

THE ISLANDS OF PARAGUA, BALABAC, CAGAYAN DE JOLO, AND ADJACENT ISLANDS.

BOUNDARIES AND AREA.

The island formerly called Palawan, and by the Spaniards called Paragua, is situated between the parallels of latitude 8° 22′ and 11° 25′ north and longitude 117° 8′ and 119° 40′ east from Greenwich. (Official Catalogue of the Exposition of Madrid.)

On the northeast is the island of Mindoro. On the east are the islands of Panay, Negros, and Mindanao. On the southeast is the Jolo archipelago, and on the south the island of Borneo. The China Sea separates it on the west from southern Indo-China. It is considered the third largest of all the islands of the Philippine Archipelago. In shape it is very long and relatively narrow, having the greatest length from northeast to southwest, 445 kilometers, and an average width of 22 kilometers. Its total area, including the adjacent islands, is 14,534 square kilometers.

INHABITANTS.

According to the official census of 1887 the population of Paragua, in the towns of Danlig, Dumaran, Puerto Princesa, Tatindan, and Taytay, is 5,985. According to Señor Canga Argüelles, who was formerly governor of this province, the Christian inhabitants occupying the northern part of the island do not exceed 10,000, and the Mohammedans, dwelling on both coasts of the southern part, number less than 6,000. Other authors give a total population of from 28,000 to 30,000.

The native population can be divided into four well-defined groups: First, the Tagbanuas, the most numerous of all, who are distinguished on account of their sociable and peaceful natures. They live in hamlets along the banks of the rivers, and somewhat resemble the Mohammedan Malays of Mindanao, though not professing the same religious beliefs. They inhabit the part of the island between Inagahuan and Dalig on the eastern coast and that between Uluagan and Apusahuan on the western coast. They are about 6,000 in number. Second, the Negritos, who can be distinguished on account of their darker complexion, curly hair, and better physical development. They inhabit the mountainous regions lying between Babuyan and Bubacan on the eastern coast, and number about 1,500 individuals. Third, the Manguianes, a little-known people, who inhabit the territory of the Moros and prevent them from trading with the outside world. Physically

they are more like the Tagbanuas, but in matters of custom more like the Moros. They number about 4,000 individuals. Fourth, the Tandulanos, who inhabit the eastern coast between the bays of Malampaya and Caruray. They are believed to number about 1,500.

LANGUAGES.

Spanish is spoken only by the few Spaniards living in the island. Moro-Joloano is most generally used in Paragua, though each one of the four groups cited has its own special language.

TOWNS, VILLAGES, AND HAMLETS.

There are three towns in this comandancia: Puerto Princesa, Taytay, and Dumaran. Puerto Princesa, with a population of 3,481, is the capital. Its port, called in the English nautical chart Port Royalist, is a magnificent natural port, well sheltered and easy of entrance. The deep water is about 1½ miles across. On the eastern coast, very near to the shore, there is a depth of from 10 to 12 meters. A lighthouse of the sixth class, with a fixed white light, is situated at the entrance of the bay. There is a little dockyard for the use of small gunboats. There is a penal colony at Puerto Princesa composed of convicts of both sexes and of deported individuals. On account of the forced labor of this penal colony it has been possible to beautify the town and better its sanitary conditions by cutting off the mangrove swamps. Rain water is used, as the town lacks a good water supply. During the rainy season some people use well water, in spite of the fact that it is very poor, while others bring water from the Iguahit River just across the bay. There are 24 villages and hamlets belonging to the towns of Puerto Princesa, Taytay, and Dumaran.

This island pertains to the diocese of Jaro. The following are classified as active missions: Puerto Princesa, with 3,121 parishoners; Tinitian, with 1,197; Dumaran, with 2,128; Taytay, with 1,733; Inignan, with 279, and Baenit, with 1,257.

PORTS, MOUNTAINS, AND RIVERS.

On account of its geographical position, Paragua is one of the most important islands of the Philippine Archipelago. It is not less important from a commercial view point, as it forms with the island of Balabac the strait of the same name, through which at certain times of the year sailing ships are compelled to pass. The island has the following ports: Puerto Princesa and Bininsulian, on the eastern coast; Ulugan, on the bay of the same name; and the Bay of Malinpaya, which, according to some authorities, has no rival in the world.

A great mountain chain extending from northeast to southwest divides the island of Paragua into two halves. Its terminal peaks are Mount Montalingahan, with an elevation of 2,080 meters, on the south, and Mount Victoria, with an elevation of 1,372 meters, on the north. Among the mountain ranges which arise from the principal one are the Malanit Range, which, beginning near Tagbayug, extends to the south; the Pulote Range, which, arising about the middle of the previous range, extends perpendicularly to it for a distance of 20 miles to the south, after which it inclines to the west, and the Bulanjao Range,

which arises near Coral Bay and extends to the northeast a distance of more than 40 kilometers. On account of the peculiar shape of the island the rivers are all short, but are of much importance, as they furnish ways of communication between the two coasts. The Iguahit River, which probably has its source on the slopes of the Aldea Range, passes through the village of the same name and empties into the bay. The Cururay, having its source on the eastern side of the central mountains, empties into the China Sea near the Bay of Magdanan. The Campan River empties into the bay of the same name, and the Pirata River into the Bay of San Antonio.

MOST IMPORTANT PRODUCTS.

All of the mountain sides are covered with abundant vegetation, forming extensive forests, which contain large numbers of excellent building woods. Among these may be mentioned narra, calandas (a species of cedar), ipil (which attains great size), camagon, molave, banaba, alopai, amuguis, arsonan, apiay (unknown in Luzon), cisbi, mansalanguin, and many others. The Fragosa-peregrina, known to the natives under the name of uring, from which gum mastic is obtained, was, until a short time ago, unknown in the Philippines. The forest wealth of this island is very great, and many species of trees not found in the rest of the archipelago grow here. There are many mangrove swamps, of which the natives utilize the three principal species—the bacanan, the tangal, and the langhoray. The production of rattan on this island is truly astonishing, an uninterrupted trade in this article being carried on between Puerto Princesa and Manila. The nipa palm, so useful and necessary to the natives, completely covers the banks of the rivers and estuaries. The cocoanut palm grows well. An abundance of gum mastic, copal, and other resins exist. Excellent tobacco, rice, and all kinds of fruits and vegetables can be grown. The island of Paragua is second to none in the wealth of its vegetable kingdom. The fine pasture lands of the island sustain large numbers of cattle, buffaloes, goats, and hogs. The famous nests made by the little swift (called salangana) are found in abundance in the deep caves around the coast. These nests are so highly prized by the Chinese that they have at times paid as much as $4,000 a picul for them; that is to say, twice their weight in silver.

As this island has not been well explored, its mineral wealth is not known. Lead and antimony are found in the form of pyrites, and there are indications of iron and copper. The hard, even slate shows some indications of iron and sulphur. Granite is found in abundance, but is soft and porous. Coral rock, which the natives utilize in the manufacture of lime, is found in abundance.

THE ISLAND OF BALABAC.

This island, situated south of Paragua, is bounded on the east by the Jolo Sea and on the west by the China Sea. On the south there is a strait having the same name as this island, which separates it from the islands of Banguey and Balanbagan, bordering Borneo. It is 36 miles in length, 8 or 10 in breadth, and has an area of 370 square kilometers.

NUMBER OF INHABITANTS.

According to the official census of 1887 there are 2,110 inhabitants, of whom but 408 are Christians. According to the general registry of the Recoleto Friars for 1897 the natives are Moros, living in the villages of Dalanan, Pasig, Catagupan, Sabos, Agutayan, Tucanigalo, Pancan, Cabulaigan, Carandurin, and Singalo.

Language.—The ordinary language in this island is Moro-Joloano.

NUMBER OF TOWNS, VILLAGES, AND PARISHES.

Balabac is the only town. It has an excellent port during the southwest monsoon. There is one other port, at Calandaran. At the entrance of the port of Balabac there is a light-house of the sixth class, showing a fixed white light. At Point Melville, at the southern extremity of the island, there is a light-house of the first class. The only parish in the island is that of Balabac.

PRODUCTS.

As in the neighboring island of Palawan, there are many excellent tropical woods, gums, resins, dyestuffs, fibers, and medicinal plants, wax, honey, etc.

The peculiar little mouse deer called pelandoc, which is unknown in the rest of the archipelago, is found here.

There is an abundant deposit of coal of excellent quality 11.14 kilometers from the town. It is said that in the territory occupied by the Moros there is a deposit of native mercury.

CAGAYAN DE JOLO.

This, the largest island of the Balanguingui group, which formerly was a part of the Jolo Archipelago, was a short time ago attached to the comandancia of Balabac. It is situated 45 leagues to the northwest of Tawi Tawi, has a perimeter of 41 kilometers and an area of 68 square kilometers. It has two peculiar lakes—one of fresh water and the other of salt water.

ISLANDS ADJACENT TO PARAGUA AND BALABAC.

WEST COAST OF PARAGUA.

CAPIAS.

This low-lying island, covered with scrub, is situated 6 miles north of Cape Buliluyan, about a mile from the shore.

BALANSUNGAIN.

These islands are situated southwest of the Bay of Marasi and in the same parallel as Puerta Princesa. They are surrounded by little islands, reefs, and rocks.

MALAPACUN.

This island is situated 3 miles west and one-fourth of a mile southwest of Point Hununock, and 1¼ miles from the coast of Paragua. It is of medium height and covered with forests.

MANGLAR, HIERBA, AND NACODA.

The coast, 2¼ miles from Point Hununock, forms a little bay, in which are the islands of Manglar and Hierba. They are low and of little area. The most northern of these has to the northeast of it a little island called Macoda, which terminates in a little conical cape. Near this cape rises the little island of Sepulero.

LA GALLINA AND LOS POLLOS.

These names are given to several scattered islands lying in front of the bay, just north of Mount Hersechel.

TRES PICOS.

This island, also called Camungyan, lies 1¼ miles north-northeast of the cape, on the northwestern extremity of Paragua.

RITA.

An island west of the Bay of Ulugan.

CAANIPA.

A little island situated at the entrance of the Bay of Cruz de Mayo.

BOAYAN.

An island situated 3¼ miles northeast of Caanipa. It is very irregular in outline, 5 miles long from east to west and 3½ miles wide from north-northeast to south-southwest.

There are innumerable small islands found between the Bay of Cruz de Mayo and the northern point of Paragua.

TULURAN.

This island is situated at the entrance of the port of Malambaya.

CONO.

An island in front of the Bay of Bolalo.

MALAPINA.

Situated just inside of the Strait of Bloqueo.

TAPINTAN.

This island has the most vegetation on it of any of the Calizas Escabrosas group.

MASINLOC.

This island is situated east of Tapintan.

JUANBUYOD.

This island lies just northeast of Masinloc.

SEMAPHORE OF THE NAVAL STATION OF BULÁBAC.

JUABUYATAN.

This island forms a group with several others of little importance just at the entrance of the Bay of Bacnit.

LAGEN.

This island is situated on the eastern coast ofthe Bay of Bacnit.

COMOCUTUAN.

On the western coast of the same bay.

CADLAO.

Situated northwest of the peninsula of Bacnit.

CANAYAN AND LA CAVERNA.

These islands are north of Cadlao.

HORMIGA.

This island is situated east of the channel between Canayan and Cadlao.

Near the northern end of Paragua are the islands of Jemelos, Diapila, Calitan, and Cabuli.

EAST COAST OF PARAGUA.

BOWEN.

A little island near the northern point of Bugsuc.

URZULA.

A little island east of Bowen.

ARRECIFE.

An island northwest of Urzula.

BAHIA DE LAS ISLAS (ISLAND BAY).

Called thus on account of the multitude of islands which border it on the east.

RASA OR KATAQUIN.

An island situated east-northeast of Point Divaque.

MALANAO.

This island, very similar to Rasa and of the same size, lies southeast of the bay of Aldea.

CAÑA.

A little island in front of the larger bay north of Puerta Princesa.

MEARA AND FRASER.

These islands, together with a large number of small islands in rocks, lie in front of Honda Bay, north of the bay of Puerta Princesa.

VERDES.

A group of islands south of Point Flecha is called Verdes.

DUMARAN.

This is the largest of all the islands adjacent to Paragua. It is 42 miles in circumference, and its mountains rise to a height of 182 meters above sea level. It is quite irregular in form, well peopled, and has a good deal of arable land; goats and hogs are abundant, and all kinds of Philippine fruits are produced.

From Dumaran to the northern point of Paragua there is a very large number of islands and of isles. Among these may be mentioned Mayabacon, Pales, Dala, Ganem, Carandaga, Icadambamcan, or Taytay, famous for its bay; Silongas, Malabuctin, Bagamdagan, Busumlbulan, Bunul, and many others.

ISLANDS ADJACENT TO BALABAC.

In the strait north of Balabac are the following islands: Secam, at the western entrance of the strait; Bancalan, 5 miles northeast of Secam; Matangul, 3 miles southeast of Bancalan; Pandanan, 3½ miles northeast of Bancalan. It is 6½ miles in length from northeast to southwest and 2½ miles wide.

BUGSUC.

This, the largest of all the islands about Balabac, is situated east of the island of Pandanan.

PAPER NO. II.

OROGRAPHY

OR

MOUNTAINS AND MOUNTAIN SYSTEMS.

INTRODUCTION.

GENERAL GEOGRAPHICAL DATA WITH RESPECT TO THE PARTICULAR ISLANDS OF THE PHILIPPINE ARCHIPELAGO.

Situated at the east of the Asiatic Continent there arises from the sea a large group of islands known by the name of the Philippine Archipelago, a name which was given to them by Ruiz Lopez de Villalobos, who was one of the first discoverers, and who gave the name in memory of the Prince of Asturias, afterwards King Philip of Spain.

These islands form one of the richest groups of islands in the Far East, and are situated between the meridians 116° 40′ and 126° 34′ of longitude east of Greenwich and between the parallels of north latitude 4° 40′ and 21° 3′, counting from the extreme southern point of the small island of Sarangani (to the south of Mindanao) to the most northerly point of the island Batanes. The distance from this southern point to the northern is 320 leagues, whereas that from east to west is 180. This archipelago is bounded on the north and west by the China Sea, on the south by the Sea of Celebes, and on the east by the Pacific Ocean. (See maps Nos. 1 and 2 of the Atlas of the Philippines.)

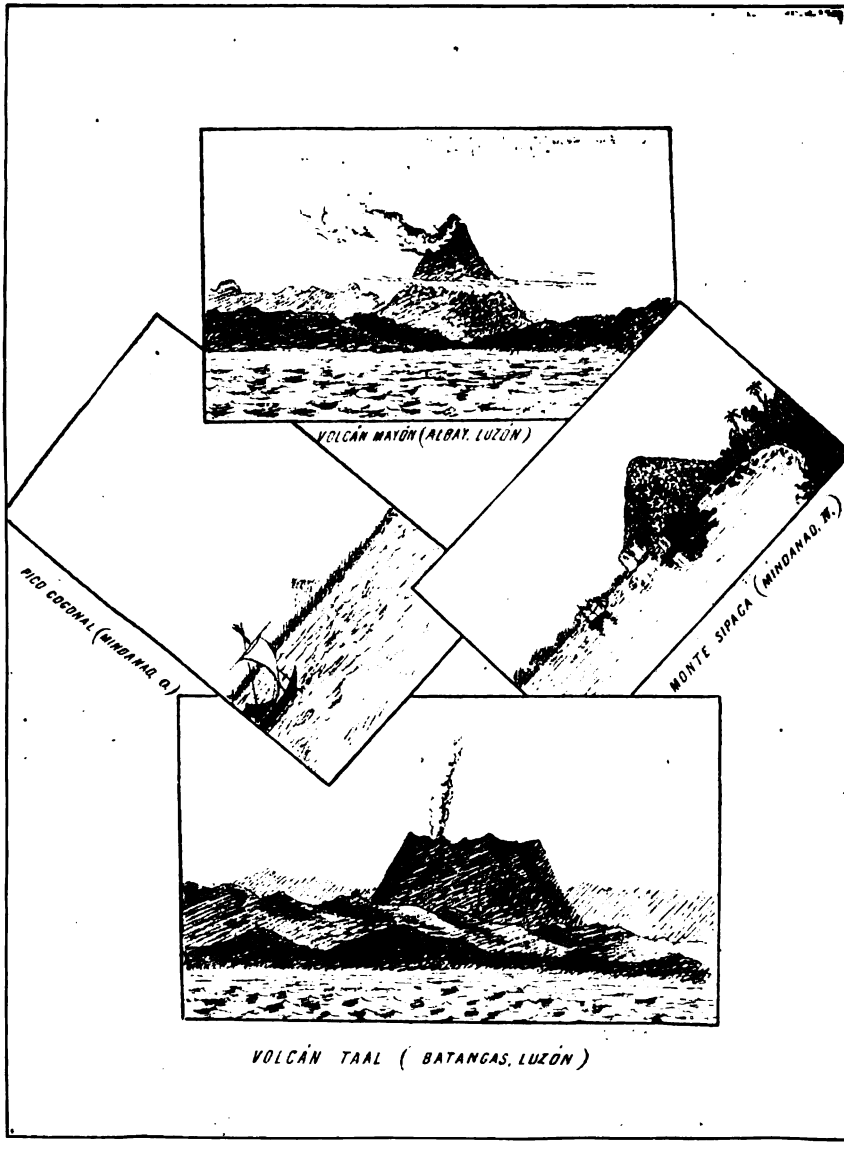
Omitting those islands of small area, we shall devote our attention principally to the islands of Luzon, Mindoro, Marinduque, Polillo, Tablas, Romblon, Burias, Masbate, Ticao, Catanduanes, Batanes, Paragua, Panay, Negros, Cebu, Samar, Leyte, Bohol, and Mindanao.

In another paper—that on chorography—the geographical conditions of these several islands are treated.

The following is a table setting forth the geographical situation, together with the superficial area in kilometers of each of the islands, given in the order of their size:

Names of islands.	Extreme latitudes north.		Extreme longitudes east of Greenwich.		Superficial area.	Maps in Atlas of the Philippines.
	°	°	°	°	*Kilometers.*	*Number.*
Luzon	12.5 to	18.7	119.7 to	124.2	106,145	7, 8, 9, 10, 11, 12
Mindanao	5.6	9.8	121.9	126.6	86,140	26, 27, 28
Paragua	8.3	11.5	116.1	119.7	14,584	24, 25
Samar	10.9	12.7	124.3	125.8	12,956	18
Panay	10.4	11.9	121.8	123.2	12,246	20
Mindoro (2)	12.2	13.5	120.3	121.5	10,167	15
Leyte	10.0	11.6	124.3	125.3	9,267	19
Negros	9.1	11.0	122.4	123.6	8,982	21
Cebu	9.4	11.3	123.3	124.1	5,714	22
Masbate	11.7	12.6	123.1	124.0	3,418	17
Bohol	9.6	10.2	123.7	124.6	3,067	23
Catanduanes	13.5	14.1	124.0	124.4	1,668	14
Polillo	14.7	15.1	121.8	122.2	779	12
Marinduque	13.2	13.6	121.8	122.2	773	10
Tablas	12.1	12.7	121.9	122.1	724	16
Burias	12.7	13.2	122.9	123.4	720	11
Ticao	12.3	12.7	123.6	123.8	373	17

Add to the superficial area, as given in the preceding table, the area of the many small islands of the archipelago, there results a total area of some 290,437 square kilometers, amounting to about two-thirds of the extent of area of the peninsula of Spain. The total number of the islands exceeds 1,400.



NOTABLE MOUNTAINS IN THE PHILIPPINES.

VOLCANO APO.
Highest mountain in the Philippines (Mindanao).

MOUNTAINS AND MOUNTAIN SYSTEMS.

CHAPTER I.

PRINCIPAL MOUNTAIN SYSTEMS.

THE SYSTEM OF MOUNTAIN RANGES IN THE ISLAND OF LUZON.

NUCLEUS OF THE SYSTEM.

The mountain system of Luzon, the most important island of the whole Philippine archipelago, is composed principally of three large ranges, whose springs form the sources of four full rivers, which, flowing through the island in various directions, irrigate it so richly and so fertilize it with their abundant waters that there is scarcely a province which does not produce in abundance the fruits natural to it. The nucleus of this mountain system is called Caraballo Sur, whose highest peak (1,400 meters) is situated at latitude 16° 9′ north, longitude 121° 4′ east from Greenwich.

Caraballos Occidentales.—The first of these ridges, called Caraballos Occidentales, runs approximately north and is divided into two parts, that of the central range, which runs three-fourths of its length before it separates between the provinces of Abra, Ilocos Norte, and Cagayan, and that of the north range, which runs from the division mentioned to the most northern part of Luzon, called Point Pata. Its total length is about 50 leagues. It separates the provinces of Pangasinan, Union, Abra, and the district of Benguet from those of Nueva Viscaya, Isabela, and Cagayan. Departing from Cabalisian, near Caraballos Sur toward the north, the district of Benguet, in which rise the ridges of Pinos and Bayabas, is left to the west of the principal range.

In one range of hills of little importance there rise the rivers Abra and Agno Grande, which, taking opposite directions, flow, the former toward the north, the latter toward the south.

The mountains Biumaca, Tapan, Cabuman, Tonglon (2,261 meters), Lugsen, and the peak of Bayabas (1,520 meters) are the most important of the heights between Union and Benguet. To the north of Caraballos Sur and at a distance equal to one-half that from this mountain to the Gulf of Casiguran is found Mount Data (2,500 meters), one of the most conspicuous of the whole region. Its branches run in the general direction of north and south. Among them rises the range of mountains Sabagan, which extends toward the district of Bontoc to the east, and also the chain called Polis, the highest region of all that country. From the ridge of Polis, giving place to the valley of Sapan, there arise in turn other branches, which, with a northeastern trend, extend to Bontoc and Cagayan, and unite with the second principal range. In this range are the sources of several tributaries to

the river of the same name. At the western boundary of the district of Lepanto, and forming the division between it and the province of Ilocos Sur, there extend the ranges of Tila and Malaya, which run southeast, entering the district of Benguet, where they join a spur of the Data. The boundary between the provinces of Abra and Ilocos Sur consists of a range which runs parallel to the principal one from south to north, thus holding the province of Abra between two large ranges. On account of the roughness and wildness of these two ranges numerous tribes of Igorrotes find safe shelter in them. From the Caraballos Norte, which forms the extreme northern point of the great range, there starts toward the west a branch called the Caraballo Chico. From these last extend two ranges of mountains, which, running parallel toward the south, enter the province of Ilocos Sur, and give to it a varied scenery.

Sierra Madre.—The important range called Sierra Madre begins at the Caraballos de Baler, situated southeast from the Caraballos Sur. It extends in the general direction of northeast, and altogether forms a continuous chain of mountains which extend from the Caraballos de Baler to the cape Engaño, in the northern point of the island, crossing the district of Principe and the provinces of Isabela and Cagayan. Its length is somewhat greater than that of the Caraballos Occidentales. The length of this range, the largest of the archipelago, is not known, nor has it been possible to determine the height of its principal mountains. One smaller branch runs to the bay of Palanan, the principal one continuing parallel to the coast and very near it.

From the Caraballos Sur and from the countries between the Caraballos Occidentales and the Sierra Madre springs another branch called Mamparan, which, running toward the north, extends to the province of Nueva Viscaya. The branches of this mountain range extend to the right from the point of deviation from the two main ranges, while farther south several branches of the Caraballos de Baler extend into the province of Nueva Ecija.

Range of the east and southeast.—The third important range, beginning at the Caraballos Sur, presents less height than the two others; also its direction is more irregular, and its length twice that of the Caraballos Occidentales. It extends from the Caraballos de Baler to the Strait of San Bernardino. Its trend from its point of separation to the boundary of the provinces of Laguna and Tayabas is north and south.

From Banahao the range turns to the southeast, which direction it maintains invariably until near Guinayangan, in the province of Tayabas, where it divides into two spurs, which extend, respectively, one more toward the south into the above-mentioned province to Point Bondog, where it ends, and the other toward the northeast, only to turn later again to the east in the end of Calagua, cross the province of Camarines Norte,[1] turn again toward the southeast, enter the provinces of Camarines Sur and Albay, until it ends in the spurs of the volcano Bulusan facing the Strait of San Bernardino.

Among the branches of this great range there merit special attention, besides the division of Tayabas, which, separating from the Cara-

[1] Although for several years the provinces of Camarines Norte and Camarines Sur have constituted only one province, called Ambos (both) Camarines, still in describing the mountain ranges we adhere, for greater clearness, to the division into two parts.

ballos de Baler, takes the direction of northeast until it ends in the point Encento, on the south side of the bay of Baler, those which extend through the province of Bulacan and the district of Morong, and those of Colasi and Bacaray, in the province of Camarines Norte.

The most important mountains.—The most important mountains of the system of the Caraballos, aside from the Caraballos Sur, are the following:

In the range of the northwest, or Caraballos Occidentales, the peaks of Sagsig Cabalisian, Salacsa, Dalandem, Mingolit, and Saluan, between the provinces of Nueva Viscaya, Nueva Ecija, Pangasinan, and the district of Benguet; those of Data (2,500 meters), Tila (1,355 meters), Mitra (1,737 meters), and Tantaguan (1,914 meters), in the district of Lepanto; those of Caburtanga, Gabaon, Dilaso, Danao, Dayos, Narapijan, and the craggy Andang, in the province of Ilocos Norte; those of Posdey (1,430 meters), Mamagued, Mabulusa, Liputen, Abra, Colango, Bumuragan, Balatinan, Molinga, Pico, and Calos, within the limits of Abra; those of Balago (1,606 meters), Cabatingan, Diablo, Maguinalem, Tibangran, and Burnay (1,913 meters), within the provinces of Abra and Ilocos Su.; and in the ridges of Ilocos Norte, from the extreme south to Point Pata on the northern coast, those of Agaumala (1,410 meters), Pan de Azucar (762 meters), Bimungan (1,183 meters), and that of Quebrada (927 meters), with the line of heights which form the Caraballos Norte.

The elevation of the peaks of the Sierra Madre is estimated as follows: The Dos Cuernos (1,204 meters), the Morses (1,283 meters), the volcano Cana (1,195 meters), and several others whose elevation, like that of others which we have mentioned, it has not yet been possible to determine.

Following the range of the east and of the southeast are the Caraballos de Baler and Subani, in the province of Nueva Ecija; Silas, Angat, Pahalang, Orion, and Tayabasan, in that of Bulacan; Simuten, Camunay, and Duyo, in the district of Morong; Malagion, Malang, Maquiling (1,133 meters), and San Cristobal, in Laguna, until we reach the Banahaa. And from the Banahaa to the district of San Bernardino those of Masalacay and Bondog, in the province of Tayabas; those of Colasi, Calungun, Bayabas, Sabro (1,552 meters), Baao, Puliamey, Paratucan, and Caramuan, in those of the two Camarines; and in that of Albay those of Buhi or Malinao, Masaraga (1,354 meters), Mayon or volcano of Albay (2,522 meters), Pocdol, Calangalan, and of the volcano Bulusan.

THE SYSTEM OF THE ISLAND OF MINDORO.

Head of the system.—Taking as the point of origin the mountain Halcon (2,700 meters), situated in the northern part of the island at an equal distance from the eastern and western coasts, the system is divided into three large ranges, which run, one in the direction from northwest to southeast and the other two from the north to the south.

The northern range is nearly perpendicular to the other two. The latter ranges, on account of being parallel not only to the coast but also to each other, make room for a large central plane, which extends between them, running north and south. This interior portion of the island is very little known as yet, on account of the absolute lack of communication across the mountains between the fishing villages on the opposite coasts.

the river of the same name. At the western boundary of the district of Lepanto, and forming the division between it and the province of Ilocos Sur, there extend the ranges of Tila and Malaya, which run southeast, entering the district of Benguet, where they join a spur of the Data. The boundary between the provinces of Abra and Ilocos Sur consists of a range which runs parallel to the principal one from south to north, thus holding the province of Abra between two large ranges. On account of the roughness and wildness of these two ranges numerous tribes of Igorrotes find safe shelter in them. From the Caraballos Norte, which forms the extreme northern point of the great range, there starts toward the west a branch called the Caraballo Chico. From these last extend two ranges of mountains, which, running parallel toward the south, enter the province of Ilocos Sur, and give to it a varied scenery.

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Among the branches of this great ran[illegible] tion, besides the division of Tayabas, wh[illegible]

[1] Although for several years the provinces [illegible] have constituted only one province, called A[illegible] ing the mountain ranges we adhere, for g[illegible] parts.

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The elevation of the peaks of the [illegible] lows: The Dos Cuernos (1,[illegible] meters), the [illegible] volcano Cana (1,195 meters), and [illegible] that of others which we have [illegible] to determine.

Following the range of the east and of the [illegible] ballos de Baler and Subani, in the province of [illegible] Angat, Pahalang, Orion, and [illegible] Camunay, and Duyo, in the district of [illegible] Maquiling (1,133 meters), and [illegible] reach the Banahaa. And from the [illegible] nardino those of Masalacay and [illegible] those of Colasi, Calungua, [illegible] Puliamey, Paratucan, and [illegible] and in that of Albay those of [illegible] Mayon or volcano of Al[illegible] of the volcano Bulusan.

Hea[illegible]
Hal[illegible]
an[illegible]

The northern range.—The northern range, which, as has already been stated, runs northwest and southeast, is probably the most important of the whole system. From Mount Halcon to the hill Calavite, situated at a very short distance from the point of the same name, it changes its direction many times and numerous spurs extend not only to the north toward the coast but also toward the interior of the island. There are many peaks. Among the highest are Calavite, Abra de Ilog, and those of Bacoo. In the neighborhood of the town of Nanjan there is a large spur or chain of mountains, which at first follows the direction of the principal range, but later turns toward the south and joins the range of the eastern coast.

The eastern range.—From the spur of Nanjan, above mentioned, extends another range, running to the west from a lake called also Nanjan. It turns to the southeast to the series of mountains which run between the towns of Nanjan and Pola. It changes its direction to the south and forms the hills of Bamtat, Bahaynatubig, and Natabang, between the towns of Pola and Socol; those of Tangot, Bongabon, and Batangan, between Socol and Tiding; and those of Mabajo, Agun, and Taitican, between Mamalay and Bulalacao, and finally, in the southern part of the island, joins the western range.

The western range.—The Abra de Ilog, near the Halcon, is the point at which rises the chain of mountains running parallel to the western coast. With numerous and important branches extending to the west, until they are lost in the sea, it encounters in its course the town of Sablayan, in whose vicinity it is interrupted, to reappear in the neighborhood of Trurum and continue in the same direction, from north to south, until it ends in the point Rumban, to the northeast of Point Bugsanga, one of those which forms the bay of Mangarin.

THE SYSTEMS OF NEGROS AND PANAY IN THE VISAYAN ISLANDS.

The mountain system of Negros.—The frame of the mountain system of the island of Negros is formed by a large range, which crosses the island from the northwest to the southwest, and by various spurs, separating from it and running in opposite directions, ending on both eastern and western coasts of the island. The situation of this range causes the general division by which the island is divided into eastern and western Negros, the former being the part on the east of the range toward Cebu, and the latter all that region on the west toward Panay. Of the branches of this central range there merit special attention those of eastern Negros, which extend toward the east and end, respectively, in the points of San Jose and Manjuyoc, and the one running toward the west, which ends in the point Sojoton. The peaks most notable on account of their height are Solitario, facing Silay; the volcano Canlaon, or Malaspina, whose height is more than 1,200 meters, situated at about the middle point of the range; Tipasi, toward the south, and the ridge of Dumaguete, in the southeastern extremity of the island.

The principal range of Panay.—It can be said that there is only one mountain range in the island of Panay. This range runs north and south from the little peninsula of Buranga, in the extreme northwest of the island, to the point Siaran in the southwest, and separates the district of Antique from those of Capiz and Iloilo. The highest point of the range is undoubtedly the mountain Madia-as, which reaches the altitude of 2,180 meters. It is situated east-southeast

from the town of Colasi, in latitude 11° 24′ north and longitude 122° 10′ east from Greenwich. From the Madia-as to the point of Pucio, in the peninsula of Buruanga, this chain runs with many variations in direction and altitude. At first its direction is north until it reaches latitude 11° 45′ north, after which it runs east and west until it ends in Point Pucio. During its course to the west it serves as the boundary between the provinces of Capiz and Antique. In the north this range becomes merely a large number of low alkali hills, and ends in the points Sabongcogon, Naisog, and Pucio. Like all hills of this formation, they are very irregular.

From the mountain Madia-as the range runs toward the south, taking the general direction south-southeast until it reaches the mountain Llorente, in latitude 10° 59′ north and longitude 122° 19′ east, from which point it takes the direction south-southwest to the mountain Nagsucubang, situated in the extreme southwest of the island, where it ends. It reappears as four spurs running to the points Sagdam, Ani-ui-y, Cadugdula, and Naisog. This part of the range also descends, but not so abruptly as the northern part. In this whole chain of mountains it may be observed that the western sides are much more craggy than those of the east, especially so in that part in which are situated its highest peaks. Finally from the Madia-as to the mountain Baloy, in latitude 11° 9′ north, it marks the boundary between the provinces of Capiz and Antique, and from the Baloy to Point Naisog it separates that of Antique from that of Iloilo.

Character of its branches.—Various are the branches which run off from the range of Panay. There are two principal ones: One, starting from the mountain Madia-as, extends through Antique, in the direction southwest, to the town of Tibiao on the western coast. The other starts from Baloy and crosses the whole island in the direction, first from west to east, and later from southwest to northeast, to the mountains Lating and Alapasco, which are the last spurs of this branch, in the extreme northeast of the island. It serves along its entire length as the boundary of the provinces of Capiz and Iloilo. The others are, in general, of slight elevation and serve only to determine the source of the tributaries which go to form the three principal rivers of the island, Aclan, Jalauz, and Panay.

In the north, between Batan and Capiz, there is also a group of several mountains in the form of a semicircle, opening toward the north and forming the shore of the Gulf of Sapian. Altogether they form a watershed for the springs of the rivers Aclan and Panay.

The most notable peaks.—We have already indicated that the most notable peak of the principal range is the Madia-as (2,180 meters). Besides that mountain there deserve special mention among those situated to the north of the Madia-as, Usigan (1,290 meters), Balabac (1,300 meters), Agotay (1,130 meters), and the mountains Toctocon (1,400 meters). Among those situated to the south there appear the Nangtud (2,050 meters), the Baloy (1,730 meters), the Tuno (1,110 meters), the Igbanig (1,303 meters), the Llorente (1,340 meters), the Tiguran (1,470 meters), the Congcong (1,070 meters), and the Tiebayat (1,010 meters).

In the branches of this range there rise the following mountains: Lacaon, Nansang, Nacuran, Lating and Alapasco.[1]

[1] See "Descripcion Fisica, Gologica y Minera en Bosquejo de la Isla de Panay," by D. Enrique Abella y Casariego.

THE SYSTEM OF MINDANAO.

Division of the system into ranges.—The mountain system of Mindanao, on account of the great changes which that island has experienced through the eruption of volcanoes and the destructive action of earthquakes, is not easily defined. The mountains Apo and Matutum constitute, among others, the nucleus from which rise two of its principal ranges. Apart from the rest of the system, which is not clearly defined, there can be distinguished four ranges called, on account of the position which they occupy with relation to the island, eastern, central-eastern, central-western, and western. Altogether they give rise to rich rivers, which, flowing through the island in all directions, fertilize it with the tribute of their waters.

Eastern range.—The first of the ranges indicated and the one best defined of all is that running from Lurigao, in the most northern part of the island, to the cape San Agustin, in its southern extremity. This range runs from its origin at no great distance from the coast in the direction south-southeast, until it meets the mountain Agtunganon. It takes later a trend to the south, always in a direction parallel to the coast, to the mountains of Manuligao. In these mountains it undergoes another change to the direction south-southeast and forms on one side the spurs of Mandadagsa, and on the other those of Tagdalit, Campalili, and Tapas, containing the sources of the rivers Guinonoan and Buguan. It ends at the mountains of Magsubay, Tagopo, and Capungunan, where rises the river Agusan. It suddenly turns from here to the south and, forming the mountains of Mayo, Amiguitan, and Sigaboy, ends in the promontory of San Agustin, after having run, throughout its whole length, more than 80 leagues.

Padre Pablo Pastello, from whom we have taken the preceding data about the eastern range, says in his explanatory note of the map of the mountains of Mindanao, published May 20, 1887, the following:

> The eastern range gives rise to the rivers of the eastern coast of the island, to those flowing to the right of Agusan, and the little rivers of Quinquin, Matiao, and Lumlug, which deposit their waters in the eastern side of the Gulf of Darao. Their sources are found in the opposite sides of the mountains, which give rise to the same Agusan. There are, besides this range, branches whose many spurs extend toward both sides, sending their waters to the streams that empty into the Pacific, and to those running into the Agusan from its right bank.

The central eastern range.—The central eastern range runs from the point Dinata, facing the bay of San Butuan and the mountain of Gingoog, on the west of the mouth of the river Agusan on the northern coast. With a direction almost entirely parallel to the eastern range, it runs to the south-southwest and separates the watershed on the left of the Agusan from that on the right of the Tagoloan, and turns toward the south until it meets Mount Apo, after having run two-thirds of its course, in about latitude 7° north, and at the height of Davao, not very distant from the lake Liguasan. At the Apo it divides into two branches, the principal one running to the southeast and ending in the southern extremity of the island, in point Sarangani; the other turns gradually to the west and ends in the western part of the bay, called also Sarangani. The general direction of this range is, as we have indicated, parallel to the eastern range, although it undergoes several depressions and elevations. Among the most important elevations is the volcano Apo, whose height, more than 3,300 meters, is the greatest

of the whole archipelago. It is also the watershed of the Pulangui or Rio Grande and of the Agusan, following for the greater part of its course very near the former.

The two eastern ranges and central eastern are united in the form of an angle, which, separating from the mountains that give rise on one side to the Agusan and on the other to the Libaganon, has for its highest point the peaks of Oloagusan. The angle formed by these two ranges forms a perfectly marked system of waters. That which rises in the eastern chain runs into the river Hijo and the tributaries on the left of the Agusan and of the Salug, and that which proceeds from the central eastern to the tributaries on the right of the Salug on one side, and on the other to those on the left of the Agusan, especially to the Manat and to the Baobo.

Finally, from the central eastern range there extends a very important branch, considered by some a distinct range. It runs from the Matutum, facing the Bay of Sarangani, and taking the direction generally from east to west, afterwards turns from the southeast to the northwest, continues parallel to the southern coast of the island to Cotabato, forming part of the right water shed of the Pulangui and those of the rivers which empty directly into the sea between the bay Illana and the Gulf of Sarangani.

The central western range.—The third, which ought to be called a group rather than a range of mountains, is exceedingly difficult to describe. In the first place, its origin is not easily determined. Some suppose it to come from the volcano Apo, but that supposition, although it at first sight seems acceptable, is not correct. The great difficulty is that it encounters the Pulangui, or Rio Grande, which with its swift current opposes a serious obstacle to the continuance of the range. Let its origin be whatever it may, it is certainly not far from the Apo, and on the side opposite the Pulangui it becomes a range of not insignificent mountains, which, dividing and subdividing into very many branches, give rise to numerous tributaries that on the western slope go to enlarge with their waters the broad current of that great river.

Three chains of this range of mountains run to the northwest. The nearest to the central eastern range is that which ends on the north side of the bay of Macajalar, in the point Lipaca. Its most notable mountains are the Balatocan, facing the Balingasac, Sobrac, Numanlog, and Quimanquil. The second, whose direction inclines more to the west than the former and which is not so high, ends in Cagayan de Misamis, its principal mountains being the Quitanglag and the Musuan. The last and most important of the former runs from the southwest to the northwest, with a still more open angle than the preceding ones of the central eastern range, passing on the north of Lake Lanao and ending to the northwest of the bay Macajalar, in point Salanang.

The fourth range of the same series runs from the north of Lake Liguasan, not far from the three which we have just described in Piquit, and with direction west-northwest. It passes to the south of the Lake Lanao and ends in the bay of Panguil, with branches to the bay Illana.

Western range.—The fourth range of Mindanao, better defined than those preceding, takes its origin in the spurs of the mountain Malindang in the comandancia p. m. of Dapitan. It runs, with two short ranges, to the northwest and northeast. From the mountain Malindang this range extends to the south, turns toward the west, and runs

parallel to the coast to the shore of the Gulf of Sindangan to the mountain Sibuyan. There it returns to its first direction of north and south, runs to the central part of the peninsula, where it extends from the Gulf of Libuguey to the China Sea, ending in the place where was the ancient fort of the Caldera, near Ayala in Zamboanga.

The higher mountains.—The mountains which reach the greatest height in Mindanao are divided according to their ranges in the following order:

In the eastern range there are the Dinata, Atunganan, Bayombong, Bungadon, Lucatan, Tagdilit, Campalili, Tapao, Tagopo, Capungunan, and Magsuibay; in the central-eastern, besides Apo (3,300 meters), are those of Sinalayao, Lagsadon, Panambuyan, Bululanan, and Matutum; in the central-western, following the order of its four branches, are the Balatocan, the Sobrac, the Numanlog, and the Quimanquil; the Quitanglag, and the Musuan; those of Panisian, Colcol, Calatungan, and Duandan, and those of Tiniptiban, Palanabahay, Pinangayonan, Sugut, Picos de Ganasi, Guran, Dagambal, Caromata, and Masibay; and in the western those of Silingan, Tres Reyes, and Malindang (2,609 meters).

CHAPTER II.

MOUNTAIN RANGES OF THE SECOND AND THIRD ORDER.

LUZON AND THE ADJACENT ISLANDS.

THE ZAMBALES RANGE.

Next in importance to the Caraballos system, already described, is the Zambales range, in the western part of the island of Luzon. Starting at Cape Bolinao, in latitude 16° 23′ north and longitude 119° 40′ east from Greenwich, the range runs north and south close to and parallel with the western coast. It serves as the boundary between Zambales and Pangasinan, then as the boundary between Zambales and Tarlac, and finally divides Pampanga and Zambales. Then it enters the province of Bataan, running its entire length from north to south, and disappears in front of the island of Corregidor at the entrance of the Bay of Manila. It is divided into three principal ranges, that of Zambales proper in the north, that of Cabusilan in the central part, and that of Mariveles in the province of Bataan, in the south. Among other peaks of some elevation are Iba, Masiloc, Lanad, Sual, and Calvario, in the Zambales range; Agudo (1,038 meters), Alto (1,127 meters), Lingo (1,659 meters), Abu (1,662 meters), and Pinalobo (1,841 meters), in the Cabusilan range, and Binlana and Butilao (1,324 meters) in the Mariveles range.

THE TAGAYTAY AND MAQUILING RANGES.

The range of this name, Tagaytay, traverses the province of Cavite along the boundary which separates Cavite and Batangas, first from northwest to southeast, and then from east to west. If it is considered as forming a single system with the Maquiling range, it is of equal importance with the Zambales range. Considered thus as a single range the directions taken are very capricious. Beginning at Point Restinga, the last of the Pico de Loro hills, which extend as far as the entrance to the Bay of Manila, this range runs from northwest to southeast, with various ramifications on both sides, as far as the southern boundary of the province of Cavite, where the Masalaysay mountains are situated. It then curves to the northeast until it meets the Sungay range, serving throughout this distance as the boundary between the provinces of Cavite and Batangas. Here the Laguna range begins and runs north and south until it unites with the Maquiling range, which, continuing in the same direction, north and south, between the provinces of Batangas, Laguna, and Tayabas, forms, with the Sosomcambing and Malarayat ranges, various chains in the southern part of the province of Batangas. The most important peaks between Cavite and Batangas are Masalaysay (842 meters) and Sungay (764 meters); between Batangas and Laguna, Maquiling (1,435 meters), Sosomcambing, and Malarayat; in the southern part of Batangas,

Toinbol, Loboo (1,052 meters), and others. Among these, although widely separated from them, is the Macalod peak (960 meters), situated in front of the Taal volcano on the western coast of Lake Bonbon.

THE BATANES AND BABUYANES RANGES.

The Batanes and Babuyanes are two groups of small islands, situated north of Luzon, which are separated from each other by the Balintang Channel. In the Batanes, the most northern islands, are the peaks of Batan and Itbayat. In the island of Bataan is Mount Irada, which rises to a height of 1,100 meters above sea level, and appears to be an extinct volcano. To the west of this is Mount Inaya. Itbayat, 14 miles north northwest of Bataan, has two peaks of medium height—Santa Rosa (206 meters), situated in the extreme northeast, and Riposet (243 meters), in the extreme southeast. The other mountains in these islands are of little importance.

Camiguin, having an altitude of 838 meters, is the only peak in the Babuyanes group worthy of mention.

MARINDUQUE.

The mountain system of this island consists of a principal range running from north to south along the eastern coast, from the most northern part, Point San Andres, to Dumali, in the extreme southern part. From Mount San Antonio, situated in the center of the range, there are various spurs running east and west, one of which terminates at the Bay of Sayao. The principal peaks are Marlanga, or Tablazo, Catala, Gasan, Picos, Tapian, and Pubun.

BURIAS.

This island has a central mountain chain running its entire length from northwest to southeast—from Point Cueva on the north to the most southern extremity. About the middle of this range rises the cloud-covered peak called Enganoso.

MASBATE.

The land of this island is much broken. The axis of its principal range takes the form of a semicircle, which, beginning at the extreme southwest, runs north and terminates in the southeast. The numerous and tortuous spurs thrown off from this range terminate near the shore, the only region in the island having level land suitable for cultivation. The highest peaks of the main range are Bagasimbahan, Cavanan, and Bagalayag.

TICAO.

This island is traversed from northwest to southeast throughout its length by a mountain chain, somewhat broken by gaps.

POLILLO.

From the central elevation of this island spurs radiate in all directions. The most notable peaks are found in the central part and are called Malalod and Capote.

CATANDUANES.

The mountain system of this island consists of three ranges starting from the center. These run respectively, one toward the north, as far as Point Yot; another toward the southeast, as far as Point Nagumbuayan, and the third toward the southeast, as far as Points Agoto and Sialat.

CALAMIANES.

These islands are in general mountainous and rugged, this being especially true of Busuanga. The two principal peaks on Busuanga are Culion and Tundalara (65 meters).

THE VISAYAN ISLANDS.

SAMAR.

Although the orographic system of the island of Samar is somewhat similar to that of Panay, or, at least, to that of Negros, so that its description might form a part of the preceding chapter, nevertheless it seems advisable to treat it separately, as it is not yet well known. In general, it is known that the island is very rough, especially in the central part. A mountain chain traverses its length from northwest to southeast, although this is divided by the valley of the river Ulut, which traverses it from the Bay of Maqueda, on the west, to its mouth near Tubig, on the eastern coast. Apart from this chain there is in the northwest a group of mountains concentrically arranged and situated near the Panros Mountains, which separate the western branches of the river Hibatan from those which empty to the north between Lavezares and Mondragon. The most notable peaks of the central chain are, Curao, Capotoan, Palapa, toward the north in the vicinity of Catubig, and Matiganao, near the Ungajon, toward the south. Mount Nabubusog, near the town of Paranas, may be seen for a long distance, because of the whiteness of its rocks, the same being true of the Vasey Mountains, situated farther to the south.

LEYTE.

Leyte is also very rugged. In the center of the island there is a mountain chain running its entire length from northwest to southeast, which is at the same time the watershed. There is another chain of minor importance in the northeast, between the Strait of San Juanico and the valley of the Cabayungan and Palo rivers. This chain extends from Point Baluarte, in the extreme north, to the mouth of the river Palo in front of the bay of San Pedro and San Pablo, on the eastern coast. The highest mountains in these islands are: In the north, Culasi; in the west, Magsanga, near Palompon; Mandirin, Caprocan, Aslum, and Sibugay, almost in the center. The volcanic peak Caolangojan is in Burauen, to the east, while in the south is Sacripante. Southeast of Leyte, and but little separated from it, is the island of Panaon, in whose southern extremity is found Mount Malangcauan, which has an altitude of 706 meters above sea level.

BILIRAN.

The mountain system of this island begins in the north, where two peaks of considerable altitude arise—Panamao and Mabuy. These,

with others of minor importance, form a chain throughout the length of the island, as far as point Pauican, in the extreme southeast. This chain forms the watershed of the island.

CEBU.

The orography of this island is very simple. A mountain chain runs from northeast to southwest, somewhat nearer the eastern than the western coast, throughout the entire length of the island. This chain becomes wider or narrower, according to the configuration of the island. These mountains are of little altitude, and do not prevent communication between the two coasts. The principal peaks are Tesubig, Mangilao, Uling, Balila, Nagtagug, Moaangid, Ungas, and Tanaoan (458 meters).

BOHOL.

The mountain chain traversing the length of this island is much more noticeable in the south than in the north, where the country is quite flat. The highest peaks are Alimario and Bunucan, in the vicinity of Tobigan; Mahanguin and Lunday, in the vicinity of Guindalman; Carabahol and Caloyhuan, in the vicinity of Nagua, and Campusa and Canlobo, in the vicinity of Catigbian. The highest mountain, Copton, having an elevation of 309 meters, is in the northeast.

SIQUIJOR.

This island is very rugged in character. Northeast of the central mountain is Mount Cudtingan, which terminates in two peaks, Sandugan and Daquit.

GUIMARAS.

The principal peaks lie along the eastern coast of the island. They are Zaljat, Pandan, and Acdan.

TABLAS.

Two ranges almost parallel to the coast and to each other traverse this island from northeast to southwest. In the northern part of the eastern chain is Mount Cabeza de Tablas, having an elevation of 733 meters, and in the central part the peak called Palaopao.

ROMBLON.

A single central mountain range traverses the island of Romblon from north to south, from Point Tongo to Point Apunan. From this range various spurs are thrown off to the right and left, the most important being that which terminates at Point Sablayan. The principal peaks are Romblon, Santiago, and Tagaytay.

SIBUYAN.

This island is quite mountainous. Among other peaks in the central part is Sibuyan, having an altitude of 1,958 meters, which dominates the island.

THE ISLANDS ADJACENT TO MINDANAO AND THE SOUTHERN GROUPS.

DINAGAT.

From Point Desolacion, in the extreme north, to a point south of Gabo the island is traversed throughout its length by a mountain range, which runs nearer to the eastern coast than to the western. Some of the peaks are of medium elevation. The highest, Mount Redondo, lying in the northern part of the island, has an elevation of 1,017 meters. Other mountain peaks are Cumbre (730 meters), Picudo (526 meters), Caballette (546 meters), and Tristan (632 meters). The eastern slope of this mountain forms Point Penascales.

SIARGAO.

This island is traversed by a little range running from north to south.

CAMIGUIN.

This island is very mountainous and rugged, having a central peak rising to a height of 1,627 meters above the level of the sea.

BASILAN.

In the island of Basilan there are several mountains more or less connected with each other which form a mountain system of little importance, Mount Guibanan or Lamutun being the most important. It extends from west to east, beginning near the capital town, Isabela, nearly to Mount Panocobon. Mount Matangal, which is situated in the extreme eastern part of the island, serves as a landmark for ships running from Cotobato to Davao. Toward the west are the peaks called Tres Picos, which serve as a landmark to boats leaving the port of Zamboanga.

JOLO.

Among the islands which form the Jolo group the only one worthy of mention is the island from which the group takes its name. Three chains of mountains almost parallel to each other traverse the island in the general direction east-northeast to west-southwest. The most elevated of these chains is that which begins at Point Tuctuc, on the northern coast, and extends to Point Silangan, on the western extremity of the island. Its highest peaks are Bahu (843 meters) and Tumatanguis (882 meters). The second chain of importance is the central range, which runs first parallel to the southwestern coast, then turns toward the east, and terminates in the western part of the island in a mountain called Tumahu, which has an elevation of 472 meters. Other peaks in this range are Tulipan (632 meters), Mabintan (492 meters), and Mahuja (337 meters). The peaks of the third range, which runs parallel to the southeastern coast, are of little importance.

TAWI TAWI.

Tawi Tawi, the largest of the group of this name, has a mountain chain running from east-northeast to west-southwest throughout its length. Mount Santiago, rising in the southeast, has an elevation of

354 meters, and Mount Dromedario, rising in the center of the island, has an elevation of 568 meters. One of the spurs of this mountain terminates in Point Balimbin.

PARAGUA.

This island is traversed by various mountain ranges of considerable elevation, which cross it in all directions, principally in the direction of its greatest length, which is from northeast to southwest. The highest peak is Mantalingahan, which has an elevation of 2,080 meters. Other peaks are Landargun (1,640 meters), Gantuang (1,783 meters), Victoria (1,726 meters), and Calibugon (544 meters).

BALABAC.

This island is quite mountainous, especially in the southern part. The highest peak is Balabac, which has an elevation of 575 meters. The range called Sierra Empinada is in the form of a semicircle, having its convexity toward the sea.

CHAPTER III.

VOLCANOES.

VOLCANIC SYSTEMS.

INFLUENCE OF VOLCANOES ON LAND FORMATION IN THE PHILIPPINES.

Judging from the geologic and orographic appearances seen in many regions in the Philippine Archipelago, volcanoes with their great dynamic force have exercised a marked influence. Thus it is easy to understand why, in addition to the numerous rocks of pure volcanic structure, there should appear so many mountains purely conical in form, which are found in almost all of the mountain ranges, and why seismic disturbances, more or less violent, are so frequent. But to what point does this influence extend? Geologically speaking, what regions are purely volcanic? What belong to other formations? What areas do they occupy? The science of geology has not been able to solve all these problems with regard to the Philippines. For the present we know but some isolated facts, with which as a basis the two volcanic systems of Taal and of Mayon have been outlined.

VOLCANIC SYSTEM OF TAAL.

According to some authors, this system begins in the chain called Caraballos Occidentales, passing by lakes Mangabol, Canaran, and Candaba, all of which were probably of volcanic origin, crosses by Mount Arayat, the mountain in Pampanga, following along the Sierra de Mariveles, the island of Corregidor, and the mountain called Pico de Loro, until it reaches the nucleus of the system, which is the active volcano Taal, where it unites with Mount Banaho and other peaks of volcanic origin. On leaving Taal and the adjacent peaks, Tombol and Malarayat, the volcanic formation disappears beneath the waters of the Mindoro Sea, to appear again in the island of Negros, in the center of which rises Canlaon, or Malaspina. It then continues in Camiguin and terminates in Mindanao, at the end of the Illana chain, among whose western peaks is found the volcano of Macaturin.

VOLCANIC SYSTEM OF MAYON.

The second volcanic system is that of Mayon, which is of much greater importance than the preceding, as containing the most important volcano, that of Mayon, or Albay, from which it takes its name. This system runs in a direction approximately parallel to that of the preceding. It contains, besides Mayon, all of the extinct volcanoes in the provinces of Ambos, Camarines, and Albay. It disappears beneath the sea between the islands of Masbate and Samar, manifests itself by large deposits of sulphur in Leyte, and, continuing on to

Mindanao, communicates by means of Mount Apo and Matutum with the volcano of Sanguir, and through this with the remaining volcanoes in the southern islands.

THEORY OF THE UNITY OF THESE SYSTEMS.

The theory which introduces these two systems of volcanoes in the Philippines is not, according to certain authors, sufficiently well founded. They maintain that the Mayon system does not hold the parallelism which is claimed for it, but that on the contrary the one begins where the other leaves off, and that there is no difference except that the Taal system begins in the northwest, and runs presently to the east, where it encounters the Mayon system, thus forming united with each other a single system, which with various inflexions traverses the different lands which form the Philippine Archipelago.

NUMBER AND DIVISIONS OF PHILIPPINE VOLCANOES.

There are 23 volcanoes in the Philippine Archipelago, 11 of these being more or less active. They are as follows: In the island of Luzon, Mayon, Taal, Bacon, and Bulusam; in the Babuyanes Islands, Babuyan, Camiguin, and Diclica; in the island of Negros, Canlaon or Malaspina; in the island of Camiguin, just off the north coast of Mindanao, Camiguin; and in the island of Mindanao, Apo and Macturin. The others are considered as extinct and are as follows: Cana, Arayat, Maquiling, Banahao, and Irasog, in the island of Luzon; Acudining, in the island of Leyte; Magaso, in the island of Negros; Dinata, Calayo, Matutum, and Butulan, in the island of Mindanao, and Saranganin, which rises southwest of Davao.

ACTIVE VOLCANOES.

MAYON.

The volcano of Mayon or Albay is situated in the southeastern part of the island of Luzon, in the northern part of the province of Albay. Its geographical location is latitude 13° 15′ 30″ north and longitude 123° 40′ 18″ east from Greenwich. It is the most notable of all the volcanoes of the archipelago, rising from the center of a great plain to a height of 2,734 meters above sea level. It is almost constantly crowned by a great cloud of vapor which is emitted with extraordinary ability and abundance from the crater.

TAAL.

The second volcano in importance is Taal, situated in Lake Bonbon in the province of Batangas. It rises from an island 22 kilometers in circumference. Its geographical situation is between the parallels 13° 52′ 4″ and 14° 7′ 42″ north latitude, and longitude 120° 53′ and 121° 5′ east from Greenwich. It is composed mainly of lava and volcanic rocks. The crater of this volcano is oval in form and measures in its greatest diameter from east to west 2,300 meters, and in its lesser diameter from north to south 1,900 meters. Its greatest height on the southwest is 320 meters above the level of the lake. From this point it descends on both sides to a height of 150 meters on the northwest

and east-southeast, and again rises to a height of 234 meters on the north. The walls of the crater are quite steep and the floor extends in the form of an elliptical plane destitute of vegetation.[1]

BACON.

This volcanic peak, called also Pocdol, rising 1,400 meters above sea level, is situated in the province of Albay, near the eastern coast between Mayon and Bulusan volcanoes. Trustworthy persons say that at times smoke rises in considerable quantities from Bacon.

BULUSAN.

The volcano of Bulusan is situated at latitude 12° 46′ 40″ north and longitude 124° 2′ east from Greenwich. Seen from the east it appears to be a single peak, which is the crater of the volcano, and which appears to have an altitude equal to that of Mayon as seen from the northwest. Seen from the south-southwest it appears to have two peaks, and very much resembles Vesuvius. It is almost extinct, but at times emits an abundance of watery vapor and sulphurous fumes.

BABUYAN.

The volcano of Babuyan is situated in the southern extremity of the island of the same name, in the Babuyanes group. On account of its appearance and its great eruption the island is completely deserted.

CAMIGUIN DE BABUYANES.

The island of Camiguin is very mountainous and high. The southern part is formed by a mountain 736 meters in height, which takes the name of the island. This is the volcano of Camiguin, which, according to the testimony of persons who have passed that way, is constantly burning.

DIDICA.

The Didicas rocks are reefs lying east of Camiguin. To the northwest and forming a group with them is a little island 60 meters high and a mile in circumference, which has on its north coast the crater of an active volcano. The common report is that this crater was formed in 1856, and that the following year there was a violent eruption accompanied with small earthquakes.

CANLAON OR MALASPINA.

Canlaon or Malaspina rises from the central mountain chain of the island of Negros about latitude 10° 24′ 35″ north. It has a height of 1,400 meters, throws out smoke continually, and, according to report, has been in eruption in recent times.

CAMIGUIN DEL SUR.

This volcano appeared the 30th of April, 1871, in a little island situated north of Mindanao, 340 meters southwest of the town of

[1] A historical account of the eruptions of Taal and Mayon may be found in the treatise on seismic foci.

Catarman. It is situated on the western part of the island. Its appearance was accompanied by a violent eruption.[1]

APO.[2]

This is the principal volcano existing in Mindanao. It is situated 15 miles west of the shore of the Bay of Daval, and is a high mountain which slopes gradually from its highest point to the shore. On its summit are three peaks, the highest of which, that to the southwest, has an altitude of 3,300 meters above sea level and is the one containing the crater. Long before reaching this crater deafening and intermittent subterranean sounds are heard, which increase as the distance diminishes. They finally become so great that it seems as though the earth would disappear from under the feet, and that an eruption would soon begin. Two expeditions have succeeded in reaching the top of this famous volcano, that of D. Joaquin Rajal, governor of Daval, in 1880, and that of the two German naturalists, Alexander Schamdemberg and Otto Koch, in 1882.

MACATURIN.

This is the highest point of the elevated Rangaya Mountains in the Sugut Range, situated in the territory of Buhayen about 40 kilometers from Pollok. Macaturin in former times gave evidence of prodigious activity, throwing out enormous masses of ingneous rock such as are now seen in the port of Pollok.

EXTINCT VOLCANOES.

CAUA.

Caua is a volcanic promontory situated in the northern part of the Sierra Madre Range near Cape Engano. It is 1,195 meters in height. It is commonly considered to be extinct, but Dr. Semper claims to have seen from Aparri a cloud of smoke issuing from this crater.

ARAYAT.

In the middle of the great plain of Pampanga, latitude 15° 13′ 28″ north, the solitary peak of Arayat rises in the form of a majestic cone to a height of 1,069 meters. Because of its situation its form and the character of the rocks which constitute it, it is clearly of volcanic origin.

MAQUILING.

Northeast of the Taal volcano, in the Tagaytay Range, which divides the provinces of Batangas and Laguna, this peak rises to a height of 1,135 meters. On its top is the crater of an old volcano, the inside of which presents very abrupt walls most marked toward the north, where they are almost vertical and have an elevation of 500 meters.

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[1]. Details concerning the eruption of Camiguin and of expeditions made to the volcano of Apo may be found in the treatise of seismic foci, chap. 4.

[2]. See map 27 of the Atlas of the Philippines.

BANAHAO.

To the east, and not far from Maquiling, is Banahao, which rises to a height of 2,230 meters above the level of the sea. Its crater, having a diameter of 5 kilometers, is entirely covered with vegetation. Its last eruption in 1750 buried the town of Sariaya and part of the surrounding country in ashes.

ISAROG.

Isarog, situated northeast of Mayon, in the province of South Camarines, is also an extinct volcano. It is in the form of a cone, rising 1,966 meters above the level of the sea.

ACUDINING.

Under this name are included some volcanic peaks in the Sierra Dagami and Danan ranges, near Burauen, in the island of Leyte.

MAGASO.

This is a volcanic mountain in the Sierra de Dumaguete range, near the town of Bacon, in the southern part of Negros.

DIUATA.

The volcanic peak Diuata forms part of the eastern range of Mindanao, and is situated between the towns of Lianga and Hinatuan.

CALAYO.

Calayo, called also Sugut, lies east-southeast of Macaturin, about 80 kilometers from the sea.

MATUTUM.

Matutum, situated north of the Bay of Sarangani, not far from the sea, is undoubtedly the crater of an ancient volcano.

BUTULAN.

Butulan is another volcanic mountain, situated north of Point Panguian, in the southern part of the district of Daval.

SARANGANI.

In the island of Balut Grande, the largest of the Sarangani group, 6 miles from the southern point of Mindanao, is the volcano called Sarangani. It has an elevation of 930 meters. Seen from the northwest it appears to have two peaks. In the extreme southwest of the island there is another volcanic peak much smaller than this.

PAPER NO. III.

HYDROGRAPHY.

PROLOGUE.

In this small treatise on hydrography we do not pretend to present an accurate work regarding the maritime and terrestrial hydrography of the Philippine Archipelago, but only to give a general idea of the hydrographic conditions of these islands, since a complete and adequate work on this subject in the actual state of the hydrographic works that have been accomplished by sea and land in the archipelago would be little less than impossible without counting on much time and on large and costly means.

We have confined ourselves to collecting and setting in order some data, taken for the most part from the "Derrotero del Archipiélago Filipino" (collection of sea charts of the Philippine Archipelago), so far as concerns the maritime hydrography, and to picking out what refers to terrestrial hydrography from maps and geographical works that have been published up to date, adding, as the complement of terrestrial hydrography, a brief study of the minero-medicinal waters, based on the reports published by scientific commissions appointed to examine said waters. Therefore, this treatise comes to be a more circumstancial amplification of what is said in the "Guia Oficial de Filipinas" (Official Guide of the Philippines) regarding the hydrogaphy of these islands.

MANILA, *December 8, 1899.*

PART FIRST.

MARITIME HYDROGRAPHY.

CHAPTER I.

LUZON AND ADJACENT ISLANDS.

ISLAND OF LUZON.

GULF.

The most important gulf of Luzon, and the only one properly such, is that of Lingayen, situated on the western coast. The entrance opens toward the north-northwest, and is comprised between the island Santiago, on the west, and the point of San Fernando, on the east. Its width in this part is some 20 miles, with soundings of 100 to 117 meters, on an average sand and mud bottom. Hence the gulf extends for 28 miles to the south-southeast. The eastern coast is formed by the high mountains of Union and dominated by the peak of Santo Tomas. The western coast is of moderate height and quite alike up to Mongosmongos, then it rises by successive steps up to an enormous mountainous mass, which runs toward the south.

BAYS.

Manila Bay.—The principal bay of Luzon, and perhaps of the whole archipelago as to its extent, is that of Manila, which occupies an unimprovable position for domestic and foreign trade with the nations and colonies of the Far East. It is situated, approximately, in the middle of the western coast of Luzon. It is beautiful, extensive, clear, and good anchoring ground. At its end there is situated the city of Manila, capital of the archipelago, and on its southeastern side the town and arsenal of Cavite. Rivers as important as the Grande de la Pampanga, the Pasig, the Orani, and the Imus, all navigable, empty into it.

The exterior elevation of the points of Hornos on the north and Limbones on the south marks distinctly the great ravine which the mountain ridge of Mariveles and that of Tagatay near the peak of Loro form between them. It has a depth of 32 miles to the northeast, and has a width of 30 miles at its eastern extremity and only 10 miles at its mouth, which is divided into two channels or passages formed by the islands of Corregidor and Pulo Caballo. The passage two miles wide, comprised between Corregidor Island and the northern shore of the entrance of the bay—that is, the Mariveles coast—is called the

"Boca Chica" (small mouth), and the passage five miles wide, formed by Corregidor Island and the southern shore of the entrance of the bay, is called the "Boca Grande" (large mouth). The "Derrotero del Archipiélago Filipino" (collection of sea charts of the Philippine Archipelago) says the following regarding this bay:

The lands which surround the interior of the bay are generally low, liable to be overflowed, and cut up by innumerable small rivers, creeks, and lakes formed by the overflow of the tide, which toward the east usually communicate with the Laguna de Bay, and toward the west with the marshy lands which drain into Lingayen.

Lapog.—On the western coast of Luzon, to the north of the Gulf of Lingayen, is the bay of Lapog, incomparably smaller than that of Manila. It is situated 10 miles to the north-northeast of Dile Point, and is comprised between Darrena Point on the north and the island of Santo Domingo on the south, and is some two miles wide by one in depth. Its southern part is called the bay of Magsingal, and the northern part the bay of Lapog, between which is found the anchorage of Lapog or Solotsolot. The northern and southern shores of this bay project reefs for a quarter of a mile, but in the middle and at the end of the bay they are wholly absent, and these make an anchorage of from 10 to 13 meters depth, sand bottom, up to near the shore. This is in the province of Ilocos Sur.

Dingala.—The bay of Dingala is found on the eastern coast of Luzon, situated 34 miles to the southwest of the cape of San Ildefonso and 18 miles, approximately in the same direction, from the sound of Baler. Its entrance inclosed between the points Sua to the north and Deseada to the south is 6¾ miles wide; it is open to the winds from the northeast to the southeast by the east, and it has a depth of 3 miles long toward the west. Both points at the entrance are very clean and the water is deep in their proximity, although that on the south has several rocks very near it on that side.

Lamon.—The bay of Lamon, or the small gulf included between the point Inaguican on the northwest and the lands of Mambulao on the southeast, is also worthy of special mention. It is 45 miles wide at the mouth and extends more than 35 miles to the south, so narrowing the island of Luzon at this point (province of Tayabas) that it reduces it to a true isthmus some 5 miles wide, which joins the large upper body of the island to the lower one, in which are the provinces of Ambos Camarines, Albay, and Sorsogon. Before the entrance of the bay is found the island of Polillo, and to the southeast of it that of Jomalig with two small islands on its eastern side which protect it from the winds from the north. Within the bay there is the little island of Balesin, and further in those of Cabalete and Alabat and neighboring small islands, which, extending from the west-northwest to the east-southeast, form with the shore at the end of the bay a sheltered port with good anchorage.

San Miguel.—Almost in the middle of the northern coast of the province of Ambos Camarines is the bay of San Miguel, open toward the north and formed by the points Sagcadoc and Sapenitan. It is circular in shape, some 10 to 12 miles in diameter, clear, and surrounded by high mountains, offering a safe shelter to all kinds of ships after avoiding the reefs which run out from the points at the entrance.

FISHING IN MANILA BAY.

FISHING IN MANILA BAY.

SMALL BAYS AND COVES.

There are many and very important ones in the island of Luzon. We shall enumerate the principal ones:

MANILA BAY.

Sisiman.—At the entrance of Manila Bay, between points Gorda and Aguaguan, on the coast of Mariveles, is the bay of Sisiman, which extends toward the northeast, with a sandy shore, where very good water is found. Its depth is from 3 to 13 meters, sand bottom.

Patungan.—Also at the entrance of Manila Bay, on the southern coast, is the bay of Patungan, included between the small islands Limbones and Carabao, between which the soundings give from 42 to 50 meters of water. It extends 2 miles to the south-southeast, toward the mountain peak of Loro, and is protected from the winds from the second and third quarters.

Cañacao.—Within the bay, between the point of sand called Sangley, in which the peninsula of Cavite ends, and the tongue of sand on which the town of Cavite is located, is the bay of Canacao. It is 7 cables wide at the entrance and extends for 8 cables to the southwest. It is only 5 to 6 meters deep. It is sheltered from the winds from the west and southwest and exposed to those from the first quarter.

Bacoor.—Besides the bay of Canacao, there is that of Bacoor, which penetrates some 2 miles toward the southwest into the province of Cavite, and has on its southern shore the important towns of Cavite, Viejo, and Bacoor. It would be a magnificent harbor if it were not choked with loose mire, which covers it to such an extent that no other craft than the very light ones of the country can navigate it.

WEST COAST.

Sailing along the western coast of Luzon, from Hornos Point toward the north, the following bays or coves are found successively in the order named:

Guay.—Between Guay Point on the north and Hornos on the south is this small bay, which is a good anchorage during the northeast monsoon.

Bagac.—Beyond Point Luzon is found the bay of Bagac, 3 miles wide and 1 deep, open to the southwest.

Caguan.—Within the port of Subic is found the cove of Caguán, toward the northwest, included between point Cabangan, which is situated at the bottom of it, and that of Manisbasco.

Silanguin, Nazasa, Tilisain, and Calaguaguin.—Are four clear and deep bays that penetrate the high and accessible coast of Capones, open to the west and southwest at the northern exit of the port of Subic, near the southern extremity of the province of Zambales.

Palauig.—Following the coast toward the north is found the cove of Paláuig, inclosed between the points Bulubutu and Nuglubilac. It is open toward the northwest, and extends 1 scant mile toward the southeast. Its depth diminishes from 25 meters at the entrance to 8 near the shore at the end.

Masinloc.—A bay comprised between points Palanguitin on the south and Bani on the north, 5 miles distant from each other.

Dasol.—To the north of the small island Raton there extends a large bay called Dasol, embraced between points Caiman on the north and Bayamban on the south. It has before it several rocks or barren islands which make the entrance dangerous, and contains within it two principal coves.

Agno Grande.—Having passed the bay of Dasol and doubled the point of Agno Grande, the cove of this name is found, of a circular form and sheltered from the winds from the first quarter, with a sandy bottom and a depth of 10 to 13 meters.

Abagata.—Near Agno Grande is the cove of Abagata, with a bad bottom.

Namagpacan.—Having passed the gulf of Lingayen, to the north of San Fernando, between point Darigayos and the point located south of Bangar, there is the cove of Namagpacan, which took the name of the town located on it.

Solbec.—The bay of Solbec is very small and is situated some 6 miles north of the town of San Esteban.

Currimao.—The cove of Currimao is inclosed between points Sugot on the south and Arboledan on the north, and is divided in two by the point Gabot, one of which is the cove of Gan, to the north of Solod Point.

Dirique.—Very near Cape Bojeador is the bay of Dirique, with fair conditions as to depth and shelter.

NORTH COAST.

Bangui.—Doubling Cape Bojeador, the large bay of Bangui is found, embraced between points Negra and Dialao.

Some other small bays are found on the north coast of Luzon, which are lacking in importance, if we except the great angle which extends from Point Pata to the strait which the island Palaui forms with Luzon, an angle which might well merit the name of bay and even of gulf of Aparri, although we do not find it under either name on the maps, nor so mentioned by any author.

EAST COAST.

Divilacan and Palanan.—Doubling Cape Engano, at some 73 miles S. 5° E. of the northeastern extremity of Luzon, is found the so-called Fronton Moises. This headland forms on its northern side the bay of Divilacan and on its southern side the cove of Palanan, semicircular in shape and very deep. Both belong to the province of Isabela.

Dilásac.—Following the coast toward the south there is found, at some 60 miles from the Fronton Moises, the cove of Dilasac or port of Tumango, between the points Dinapiqui and Tarigtig in the province of Isabela.

Casiguran.—This magnificent bay is found a few miles to the south of Point Tarigtig, formed by a great tongue of land which extends from the north-northeast to the south-southwest and ends in the cape or point San Ildefonso, in the district of Principe.

Baler.—In the same district of Principe, a short distance to the south of Cape San Ildefonso, extends the spacious bay of Baler, between the points Delgaga and Encanto.

Dibut.—The bay of Dibut opens between the points Diotoring and Encanto.

Ápat and Sógod.—Are two open bays on the northern coast of Tayabas and Camarines, respectively.

Lagonoy.—This broad bay, formed to the south of the peninsula of Caramoan, penetrates some 18 miles to the west-northwest, and is some 22 miles wide.

Tabaco.—The bay of Tabaco extends to the south of Lagonoy. It is elliptical in shape, some 6 miles in extent on its major axis, which runs from northwest to southeast. It is formed by the cove which indents the coast of Luzon between Natunaguan and the tongue of land which projects toward the east as far as Point Sula and the islands of San Miguel and Cacraray. It has from 10 to 15 meters of water very near the shore.

Albay.—The bay of Albay is found in the northern part of the southeastern extremity of the peninsula in which the island of Luzon terminates.

Sugot.—Doubling Point Cauit, in the bay of Albay, there is found toward the east the cove of Sugot, which opens to the east of the town Bacon. It is of little importance.

Gubat.—This cove is found some 12 miles to the north of the town of Bulusan.

Matnog.—The cove of Matnog opens between the reefs which surround the coast from Caranhan to Point Pandan.

Dunol and Babulgan.—Are two small coves located in the extreme southeast of Luzon.

Milagbiga.—Before passing Point Tajiran, which is the most westerly of the southeastern extremity of Luzon, in the Strait of San Bernardino, is found the cove of Milagbiga, inclosed between a headland of pebbly sand covered with trees, called Coroncoron, and the next point to the east Suac, of small extent, but very deep.

SOUTH COAST.

Tajiran, Canomalag, Cabaranan, and Marinap.—Beyond Point Tajiran are found the coves of Tajiran, Canomalag, Cabaranan, and Marinap, embraced between points Tajiran and Barugo. That of Marinap is good for ships of any tonnage.

Bulag.—To the southeast of Point Bulag, between points Angil and Barugo, extends the bay of Bulag, of good depth and with conditions favorable for craft.

Palatuan.—Passing the port of Sorsogon, traveling toward the west, is the cove of Palatuan, to the east of the port of Putiao, of little depth and formed by the points Calcut and Bantique.

Macoto and Canmahala.—Beyond Point Cadburanan or Panganiran the coast deviates toward the north to form the great bay of Ragay. Between said point and that of Bondog, in the southern extremity of the peninsula of Tayabas, some 43 miles distant from one another, various minor coves are found. The first is that of Macoto, between points Macoto and Badian, clear and with a good depth, which varies from 10 to 42 meters, although the shore is accessible.

Jamuraon.—The cove of Jamuraon comprised between points Sibono and Siruma or Caurusan, is formed of a headland of high lands, having 33 meters of water in their vicinity. It is 7 miles wide and 1½ long.

Caima.—To the southeast of the small island Saboon the bay of

Caima opens, 8 miles long by 3 deep, ending toward the south at Point Galvaney. It is obstructed with large reefs.

Ragay.—The end of the bay formed by the province of Tayabas and that of Ambos Camarines is properly called the bay of Ragay, although some give this name to the whole extent of sea inclosed between the two above-mentioned provinces.

Catabanga.—Bay to the northwest of that of Ragay, inclosed between Point Quilbait and that of Bagutayoc, distant 3½ miles from one another.

Talcauayan.—Bay formed by points Ausan and Mambulao.

Catimag.—The bay of Ragay ends in a little cove called Catimag, into which the small river Vinas empties.

Peris.—Following along the western coast of the great bay of Ragay there is found the cove of Peris, some 13½ miles to the northwest of Point Gorda, inclosed between points Lian on the north and Guihalinan on the south.

Sombocogon.—Passing by Point Gorda and the port of Pusgo there is found the cove of Sombocogon, 3½ miles to the north-northwest of Point Arena, which is very much frequented by the small native craft.

Pinamuntangan.—Rounding the point of Bondog, in which the headland called Head of Bondog ends, the cove of Pinamuntangan is found, embraced between the haven of Aguasa and the point Pinamuntangan. It is small and open toward the west.

Aguasa.—The haven of Aguasa is found to the north-northeast of the preceding one.

Ayoni.—The harbor of Ayoni opens near the previous one.

Catanaguan.—Five miles to the east-southeast of Point Tuquian extends the cove of Catanaguan, some 2 miles wide and 1 deep. It is good and sheltered from the winds from the first and fourth quarters.

Pagbilao.—Following along from Point Taquian, coasting toward the northwest, is the haven of Pagbilao, between points Bocboc or Bantigui to the west and the south point of the island Capulaan or Pagbilao Grande to the east. It is 2 miles wide. The entrance is difficult and the space for anchoring limited.

Capulaan.—The cove of Capulaan is found to the southwest of the island of this name.

Domonclon.—A small cove formed to the northeast, and at a short distance from the river and point Tayabas.

Buenli.—Another small cove formed by the low point of Tayabas on its western side.

Great bay of Tayabas.—All the small coves included between points Bondog and Bantigui are found within the so-called bay of Tayabas between the provinces of Tayabas and Batangas.

Ilijan.—The haven of Ilijan opens next the point of that name toward the east. It has an extent of one mile and ends in the flat and clear coast point called Arenas.

Burijan.—Passing through the northern passage of Verde Island to the west, there is found the small elbow or cove of Burijan. It is obstructed and has little importance.

Marara.—Near the preceding elbow is found the haven of Marara, which unites good conditions of depth and shelter.

Pinagcurusan.—Sailing past Point Tubunan toward the west, in the space of half a mile the coast presents two headlands of rock, inter-

posed with sandbanks, from which the coast of beach and woods extends to form the cove which the natives call Pinagcurusan.

Tingloy.—This cove, just as the preceding one, is found on the northeastern coast of the island of Maricaban. The headland Putin-Bujanin and the point Tubunan form it. It is small and is almost unused on account of its many reefs and shoals.

Batangas.—The bay of Batangas is inclosed between Point Cazador to the west, and that of Matocot to the east-southeast, distant 9 miles from each other. It has a clear coast and is very deep, and the haven of Mainaga is included in it.

Janaojanao.—Is found to the south of the cove of Taal.

Taal.—The cove of Taal is on the northeastern coast of the bay or haven of Balayan. It is some 5 miles in extent and is bounded on the south by the point and small pointed islands of Janaojanao.

Balayan.—This harbor opens immediately to the north of Point San Pedrino; it penetrates a little more than 2 miles to the northwest, and ends in the river and town of Balayan, some 6 miles north of said point.

San Pedrino or Pagapas.—The cove of San Pedrino is inclosed between the northeast headland of Cape Santiago and Point San Pedrino, extending some 3¼ miles to the northwest.

Bay of Balayan or Taal.—This broad bay extends between Point Benagalet on the east and Cape Santiago on the west, which are 13 miles distant from each other. It enters some 14 miles toward the north; is a clear coast, without depth, and with very accessible shores.

SOUTHWEST COAST.

Talin.—Rounding Cape Santiago the cove of Talin is found, formed by the points San Diego and Talin. It is 3¾ miles wide and 1⅛ miles deep in the southwestern part; it is exposed and has an uneven bottom.

Nasugbu.—Sailing along the coast from Point San Diego toward the north is found the cove of Nasugbu, formed by said point and that of Nasugbu. It is formed of low land with a beach of dark sand, and is accessible, with trees up to a very short distance from the edge.

Looc.—The cove of Looc opens immediately to the south of the point and small barren island of Buri, and is embraced between this point and that of Fuego or Calayo on the south, which are 2 miles distant from each other. It is a very poor anchorage.

Passing by the cove of Looc and following the coast in the direction of Manila Bay, is the cove of Patungan, already described in the beginning.

PORTS AND ANCHORAGES.

MANILA BAY.

Manila.—Naturally the port of Manila is nothing more than an anchoring ground. Some craft of great burden can enter into the Pasig River and anchor in it when they can pass the bar of the river, which is quite a difficult passage at low tide. An artificial port is being constructed.

Cavite.—The port of Cavite is located to the south of Manila Bay and one-third of a mile to the southeast of the town of Cavite. It is the port and arsenal of the navy, and arranged solely to make the

necessary repairs to the ships of the military station. The anchorage of Cavite is small and has a depth of only 5 to 5½ meters. It is exposed to winds from the east and sheltered from those from the west.

Corregidor.—On the north coast of Corregidor there is a small port for minor craft, of good depth and excellent anchoring ground, sheltered from the north wind.

Mariveles.—The port of Mariveles is on the south coast of the province of Bataan, to the northwest of Corregidor. The points Lechones and Gorda define the entrance. It is a good port in which ships of any tonnage can anchor.

WEST COAST.

Binanga or Minangas.—At a short distance to the north of the entrance of Manila Bay and to the southeast of that of Subic, is the port of Binanga, very small and protected from all winds excepting those from the west and west-southwest.

Subic.—The port of Subic, one of the best in the archipelago, is located at a short distance to the northwest of the preceding one. It consists of a spacious bay, within which there are very well sheltered and safe coves with good anchorages, such as that of Olongapo.

Iba.—On the same coast of Zambales, some 40 miles to the north of Subic, is the anchorage of Iba, commonly called Hoya de Iba, in the center of the cove formed by points Guay and Iba.

Matalvi.—The port of Matalvi is the one which the island of this name forms with the south coast of the bay or cove of Masinloc.

Salvador.—The island of this name has a fair anchorage on its western coast, which is near the previous port.

Santa Cruz.—The anchorage of Santa Cruz is a small cove formed by the point of this name on the south and Balibago on the north.

Dasol.—To the east of point Caiman is the cove of Dasol, which contains two anchorages of good depth.

Bolinao.—The island of Santiago, in the gulf of Lingayen, and the peninsula of cape Bolinao form a narrow channel, open towards the northwest, with a depth varying from 14 to 22 meters, called the port of Bolinao.

Cien Islas.—The anchorage of Cien Islas is found south of the group of islands of this name on the western coast of the gulf of Lingayen.

Sual.—The port of Saul is the second cove, 2 miles south of the island of Cabalitían. The interior of this port is divided into two anchorages, separated by a bank of coral which, running out from the west coast, extends for more than half its distance towards point Portuguesa.

Santo Tomas.—The port of Santo Tomas, in the province of Union, is formed by a bank which runs from point Santo Tomas for approximately 2 miles toward the south, over which there are from 3 to 10 meters of water.

San Fernando.—In the same province of Union, a small peninsula to the north of Santo Tomas forms with the adjacent coast two small anchorages; in the southern one there is a depth of 11 to 12 meters, and in the northern one is the port of San Fernando.

Santiago.—The small port of Santiago is situated 4½ miles N. ¼ NE. of point Candon, in the province of Ilocos Sur.

San Esteban.—The port of San Esteban is also small and accessible. It is found 2½ miles from that of Santiago.

Cauayan.—The anchorage of Cauayan is 2½ miles to the southwest of Vigan.

Salomague.—The port of Salomague is a small haven surrounded with reefs. It is safer and more sheltered than that of Lapog.

Lapog.—Is an anchorage at the foot of the bay of this name.

Cabugao.—Between the islands Salamogue and Badoc is the anchorage of Cabugao, some 11 to 13 meters deep.

Currimao.—The port of Currimao, in the province of Ilocos Norte, is a small circular haven formed to the east of point Arboledan.

Dirique.—The anchorage of Dirique is found in the bay of this name and is from 11 to 20 meters deep.

NORTH COAST.

Bangui.—The anchorage of Bangui, situated near the northeastern extremity of Luzon, is in the bay of the same name. Formerly it was a good port, but it was closed by an earthquake.

Aparri.—The port of Aparri, if it may be called such, is obstructed and is opposite the southeastern point of the entrance of the large river of Cagayan. The bar of the river has very little water over it and at certain seasons of the year large ships can cross it with difficulty.

San Vicente.—The port of San Vicente lies between the northeastern extremity of Luzon, the little island of San Vicente, and the southeastern part of the mountainous and rugged island of Palaui. It can hold several ships perfectly protected from all winds, and is 5 to 10 meters deep, with a mud bottom. Before the mouth of the port there are some good anchoring grounds, but more exposed than the port.

EAST COAST.

Dimalansan and Bicobian.—Are small ports which open in the harbors of Divilacan and Palanan.

Tumango.—The port of Tumango is found in the bay of Dilasac.

Lampon.—The port of Lampon is situated in the northwestern extremity of the bay of Lamon. It is small, but well sheltered. It is celebrated in history because it was for several years during the sixteenth century the depot of the galleons and wealth of Manila, called the Royal Port. It is located in the district of Infanta.

Mambulao.—Is found to the northeast of the end of the bay of Ragay, on the opposite coast, inclosed between points Pinandunguan and Dajican.

Sisiran.—The port of Sisiran is remarkable because it is the one which, at the end of the last century, was considered the only one on the opposite coast of Luzon to receive the ships which arrived late from Acapulco or to hold hidden and ready a ship for carrying state papers to New Spain or Mexico. It is formed by the island Quinalayag, on the west, and the point Pambuan, on the east, and is sheltered, clear, and of good depth.

Tabaco.—The anchorage of Tabaco is in the bay of the same name.

Sula.—The port of Sula is formed in the southern extremity of the narrow channel which separates the island of Cacraray from the mainland. It is very sheltered and good anchoring ground.

SOUTH COAST.

Sorsogon.—Rounding point Tajiran toward the west is the magnificent port of Sorsogon, considered as the best of all those which are found in the passage from the strait of Verde Island to that of San Bernardino. (Described in the Treatise on Chorography, Chapter V, p. 79.)

Putiao.—The port of Putiao is a bay of little depth, which the coastwise ships are accustomed to enter at high tide. It lies between points Dumaquit, on the west, and Cutcut, on the east, and is surrounded with reefs.

Pantao.—The anchorage of Pantao is to the southeast of point Simura, near the cove of Jamuraon.

Pasacao.—The anchorage or bar of Pasacao is between two little flat-topped hills, near point Sibono.

Pusgo.—The port of Pusgo is found to the north-northwest of point Arena. It is long and narrow.

Mulanay.—The anchorage of Mulanay is located on the western coast of the peninsula of Tayabas, south of the bay of Catanauan.

Pitogo.—The anchorage of Pitogo is 2 miles to the east-northeast of Point Mabio.

Calaylayan.—The anchorage of Calaylayan is an elbow which is formed to the west of Point Silancapo.

Laguimanoc.—The port of Laguimanoc is inclosed between the east coast of the island Pagbilao Chico and the coast of Laguimanoc.

Bay of Tayabas.—Along the whole coast comprised between the river Tayabas and the river Nayun it is possible to anchor in the depth of water that may be suitable, because at a little more than half a mile from the shore there is a depth of 18 meters.

It is also possible to anchor on that part of the coast comprised between the river Nayun and the small cove situated to the northwest of Point Bantigui. From Point Bantigui up to that of Malabrigo there are quite a number of elbows and sites suitable for anchoring, especially beyond Point Sigayan. Likewise along the coast which runs from Point Malabrigo to the cove of Ilijan or Matocot ships of any tonnage can anchor,

Sur de Batangas.—The deep and narrow channel which is formed between the islands of Maricaban and Caban is a good anchorage for all kinds of ships. Such is the case also with the one found on the coast comprised between points Bauan and Pinamucan, which terminates in beaches of sand.

Taal.—The best anchorage in the bay of Taal is to the north of the mouth of the river Pansipit.

Balayan.—The best anchorage in the harbor of this name is found to the east of the river Balayan.

SOUTHWEST COAST.

Talin.—Rounding Cape Santiago and following along toward the north is the cove of Talin, and in it an anchorage with fair conditions.

Nasugbu.—To the northwest of Talin is the anchorage of Nasugbu, in the cove of the same name.

Jamelo.—Finally, 2½ miles south of Point Limbones, the cove of Jamelo opens, and to the southeast of it is situated the port called Jamelo, with a clear coast and good anchoring ground.

CAPES AND POINTS.

The capes of Luzon are: Bojeador, in Ilocos Norte; Engano, on the island of Palaui, extreme northeast of Luzon; San Ildefonso, at the entrance of the cove of Casiguran, district of Principe; Santiago, on the southwest of the bay of Balayan, province of Batangas; and Bolinao, at the entrance of the gulf of Lingayen, province of Zambales; to which should be added, according to some authors, that of Baluagan, located on the eastern coast of the bay of San Miguel.

As to the points, we have already enumerated almost all the principal ones in Luzon in locating the various bays and coves; nevertheless, in order that they may be recognized with greater facility on the maps, we shall cite them here in their order, especially the most important ones, commencing from Manila Bay and passing round the island of Luzon by the northeast and south until we reach the entrance of the same bay from the south.

MANILA BAY.

In the interior of Manila Bay point Sangley, of the province of Cavite, juts out, and on the northwest coast of this same province point Restinga. On the east coast of the province of Bataan are found, successively, points Malabaton, Pandan, Linao, Lamao, Limay, Real, San Jose, and Lasisi, and on the south coast those called Gorda, Talayo, and Hornos.

WEST COAST.

Bataan.—Points: Guay, Luzan, Canas, Caibaba, Saisain, Napo, Alinin, and Nabasan.

Zambales.—Points: Biniptican, Silanguin, Capones, Botolan, Casilagan, Palauig, Oyon, Bani, Arenas, Santa Cruz, Bunop, Bayamban, Dauli, Caiman, Tambobo, Arena, Piedra, Balingasag, Encarnada, Verde y Pastora.

Pangasinan.—Points: Portuguesa and Manya.

Union.—Points: Santo Tomas, Baoang, San Fernando, and Darigayos.

Ilocos Sur.—Points: Candon, Dile, and Santo Domingo.

Ilocos Norte.—Points: Solod, Culili, Blanca, Negra, and Dialao.

NORTH COAST.

Ilocos Norte.—Points: Mayraira, Buagan, and Lacaylacay.

Cagayan.—Points: Cabicungan, Pata, Batulinao Pont, and Diur.

Island of Palaui.—Points: Nordeste and Cogon.

EAST COAST.

Cagayan.—Points: Escarpada, Quijada, Padnanungan e Higan.

Isabela.—Points: Dimalansan, Aubarede, Disumangit, Dibinisa, Dinatadmo, Dinapiqui y Tarigtig.

Destrito del Principe.—Points: Delgada, del Encanto, Dicapilarin, Dibayabay, Diotoring y Dicapinisan.

Nueva Ecija.—Points: Sua, Sapio y Deseada.

Distrito de la Infanta.—Points: Inaguican y Tacligan.

Tayabas.—Points: Piapi, Saley, Malazos, Pilisan, Majabibujaguin, Pangao, Maguigtig, Minanucan, Camu, Roma, Panjan, Pangao y Dapdap.

Ambos Camarines.—Points: Mapinjor, Palapinuhuajan, Jesus, Pinagdungan, Calibigaho, Malugnon, Buluagan, Manin, Sauan, Longos, Tanoban, Bancalon, Sagcadoc, Manuse, Pambuan, Taron, Sihan, Colasi, Sapenitan, Quinabucasan, Dagdagun, Tambang, Tinajuagan, Panahonga, Pandanog, Batabato, Rungus, Maulao, Asuang y Sibauan.

Albay.—Points: Gorda, Entilan, Misibis, Mainonon, Bato, Canagaayan, Cogbalisay, Pinagbucan, Cauit, Paran, Calaocalao, Bongo, Jesus y Gajo.

Isla Cacraray.—Points: Tumaras, Sauras, Cabadia, Cacraray y Damacan.

Isla Batán.—Points: Camisog, Calanagan, Naualangpalay, Bucton y Binalbagan.

Isla Rapurrapu.—Points: Acal, Mamanao, Talisay, Ungay y Babayon, en el extremo mas occidental.

Sorsogon.—Points: Paguiriran, Bingay, Montufar, Dancalan, Banga o Cagan, Tang, Dongon, Binorongan, Talagio, Pacahan o Habang, Pandan y Caranhan.

SOUTH COAST.

Sorsogón.—Points: Babulgan, Langao, Sual, Tajiran, Anambogon, Cabaranan, Lipata, Barugo, Marinap, Angil, Saban, Nungay, Quinalapan, Inacanan, Ibalong, Mantag, Bagalao, Macugil, Caguayan, Tubiajon, Roja, Alimpayo, Bantique y Dumaquit.

Albay.—Points: Marigondon, Cadburanan o Panganiran, Badian, Tobian, Naga, Cananhalan, Sinlian y Palo.

Ambos Camarines.—Points: Caurusan o Siruma, Tongon, Jamuraon, Sibono, Tanuan, Buri, Bagulayo, Galvaney y Octoc.

Tayabas.—Points: Cabasbatan, Mambulao, Cabunganan, Quilbait, Ausan, Balogo, Calimu, Capuluan, Lian, Guihalinan, Gorda, Pusgo, Bahay, Arena, Pasangahan, Bondog, Pinamuntangan, Subunguin, Cagumu, Lipata, Pasil, Mulanay, Cuyacub, Ajus, Nanpulo, Sandoval, Tuquian, Mabio, Salincapaoraan, Malatandan, Andayan, Tinabagsan, Pinacapulan, Palaspas, Angat, Bocboc y Tayabas.

Batangas.—Points: Bantigui, Locoloco o Sigayan, Malagundi o Galban, Punas o Loboo, Malabrigo, Rosario, Talajib, Arenas, Matocot, Pinamucan, Pangot, Mapilio, Mainit, Cazador, Azufre, Bonete, Malatanguit, Magallanes, Ligpo y San Pedrino.

SOUTHWEST COAST.

Batangas.—Points: Talin, San Diego y de Fuego o Calayo.

ARCHIPELAGOES OF BATANES AND BABUYANES AND ISLANDS OF POLILLO AND CATANDUANES.

BAYS.

ARCHIPELAGO OF BATANES.

Santo Domingo.—This bay is situated on the west coast of the island of Batan. It has good anchoring grounds of fine sand and coral.

Sonson and Mananion.—On the northeast coast of the same island there are also two very deep and probably very sheltered bays called Sonson and Mananion.

COVES.

POLILLO.

Matacon.—The cove of Matacon is formed almost in the middle of the north coast of the island of Polillo.

Pinavisagan.—This is another small bay on the north coast of Polillo, situated a little more to the east than the previous one.

CATANDUANES.

Carao or Carabao.—The larger of the two small bays which are formed to the northwest of the island of Catanduanes, between points Carabao and Caramuan, is called Carao or Carabao.

Cabugao.—Is another small bay which opens on the south of the same island.

PORTS AND ANCHORAGES.

BABUYANES.

Fuga.—The port of Fuga is situated between the western extremity of the island of this name and two small, low adjacent islands called Bari and Mabac.

CATANDUANES.

Baras.—The little port of Baras is found on the southwest coast of the island of Catanduanes, some 9 miles to the northeast of the point Nagumbuayan.

POINTS.

ISLAND OF POLILLO.

The principal points of the island of Polillo are those of Panampalan, Banta, and Agla.

CATANDUANES.

In the island of Catanduanes there are worthy of mention points Pandan and Carao on the north, Anajao and Pandaran on the east, Nagumbuayan, Taguntum, and Agojo on the south, and those of Sialat, Cogon, and Ilacaong on the west.

MINDORO AND ADJACENT ISLANDS.

BAYS AND COVES.

NORTH COAST OF MINDORO.

Abra de Ilog.—The cove of Abra de Ilog has a low shore and a semicircular form.

Balateros Grande.—The bay of Balateros Grande is found 1 mile to the east of the little port of Minolo.

Balateros Chico.—This cove is found immediately to the east of the preceding one.

Varadero.—The cove of Varadero is 2 short miles to the southwest of point Escarceo.

Subaang.—The cove of Subaang lies to the west of the point of this name.

Calapan.—The cove of Calapan extends between points Baliti to the southwest and Calapan or Tibao on the northeast, and is some 3 miles in extent.

Pola.—The cove of Pola is formed to the northwest of Mount Dumali, between points Anahaoan and Dayap.

Dayap.—Is an elbow situated at some 6 cables to the southwest of the point of this name.

EAST COAST.

Mansalay.—The small bay of this name is found 10½ miles to the north of Point Buyallao.

Pinamalayan.—The bay of Pinamalayan is located south of the northeast extremity of the island, between points Balete and Dumali.

SOUTH COAST.

Pandarochan.—The bay of Pandarochan is inclosed between the clear and accessible point of Buruncan, the southern extremity of the island, and the southeast point of Ylin.

Bulalacao.—The cove of Bulalacao opens between point Tambilambi, to the west, and the peninsula of Pandan to the south southeast.

Loguicay.—The bay of Loguicay lies between the peninsula of Pandan and the south coast of Point Buyallao.

WEST COAST.

Paluan.—The cove of Paluan is situated south of Mount Calavite, between points Pantocomi and Marigil. It has a good depth at the entrance and better in the interior up to a half mile from shore.

Tubile.—The small bay of Tubile is found north of the point of the same name.

Mamburao.—There is a little elbow toward the left within the mouth of the river of this name.

Pandan.—The cove of Pandan is north of the point of this name.

Dongon.—Some 7 miles south of Sablayan is the prominent point of Dongon, and to the east and northeast of it the coast forms the little bay of the same name which can shelter all kinds of ships.

Iriron.—The cove of Iriron is inclosed between points Iriron and Lumintan.

Lalangan or Gomez.—The cove of this name is formed near the middle of the channel of Ylin.

MARINDUQUE.

Several small bays are found on the coast of Marinduque near San Andres, Santa Cruz, and Trapichihan, opposite the small barren islands of Engano.

Loog.—The bay of Loog is within the harbor called Port of Banacalan or San Andres.

Marlanga.—The small bay of Marlanga lies between the point of this name and that of Salomague.

Calancan and Sayao.—The cove of Sayao is on the western coast and that of Calancan on the eastern coast of Point Trapichihan.

LUBANG GROUP.

Balaquias.—The cove of Balaquias is situated to the west of the island of Ambil and ends on the east at Point Tagbanan.

Ancaguayan.—The little bay of Ancaguayan, situated on the east coast of Lubang and formed by points Napula and Antipolo, is sheltered from all winds but those from the east northeast to the west southwest and is protected from the sea by several reefs.

Loog.—The cove of Loog is situated near the southeastern end of the island of Lubang, inclosed between points Panican on the south and Tumbaga on the north, and looks like a beautiful bay, but it is very dangerous on account of the many ledges of rock hidden in it.

Tabag.—The small bay of Tabag is 1 mile to the northeast of Point Acagasan.

SEMERARA GROUP.

The west coast of the island of Semerara forms some bays up to Point Taboan. There is another cove to the southeast of said point.

The bay formed on the west coast of the island of Caluya is worthy of notice.

CALAMIANES GROUP.

Baquit.—The bay of Baquit, which opens on the south coast of Busuanga, the largest island of the group, deserves to be mentioned.

Lucayan.—Next to the bay of Baquit, to the W., is formed the cove of Lucayan.

Coron.—The name Bay of Coron is given to the extensive bay formed by Coron on the east, Busuanga on the north, Culion on the W., and the small islands Dunaun, Tempel, and Bulalacao on thesouth. It is some 13 miles wide.

CUYOS GROUP.

There is scarcely any bay of importance in the Cuyos group, because all the islands of this group are small.

PORTS AND ANCHORAGES.

NORTH COAST OF MINDORO.

Calavite.—To the north of the point of this name is a good anchorage.

Ambil.—To the south of Point Binuanga there is formed an elbow or bay, in front of which is one of the best anchorages on this coast.

Minolo.—The anchorage of Minolo opens immediately to the east of the point of this name.

Galera.—The so-called port of Galera opens 1⅔ miles to the west of Point Escarceo.

Varadero.—The cove of Varadero is some 2 miles to the southwest of Point Escarceo and opens toward the southeast. It is an excellent anchorage in all weather, except in the case of a severe storm passing very near on the south. It is much preferable to the port of Galera.

Naujan.—To the southeast of the mouth of the river of this name there is an anchorage for all sorts of craft.

EAST COAST.

Masi.—Opposite the river Masi there is an anchorage in the angle which Point Bongabon forms to the northwest. It is excellent in all weather and for all sorts of ships.

SOUTH COAST.

This coast has neither ports nor anchorages of sufficient importance to be worth mentioning, unless there are some for small boats.

WEST COAST.

Mamburao.—A fair anchorage opposite the mouth of the river Mamburao.

Sablayan.—The anchorage of Sablayan lies to the east of Point Pandan.

Mangarin.—The port of Mangarin is found north of the strait of Ylin and some 3 miles to the southeast of Point Busuanga. It is very sheltered and quite deep.

MARINDUQUE.

San Andres or Banacalan.—The port of San Andres, open toward the west, lies between points Antagtacan on the north and Panumitangan on the south.

Santa Cruz.—The port of Santa Cruz is to the southeast of the point of the same name.

Marlanga.—The anchorage of Marlanga is in the bay of the same name.

Boac.—The anchorage of Boac is near the river of this name, to the southwest of the fortress of Boac.

YLIN GROUP.

Ylin.—The anchorage of Ylin is in front of a reef which surrounds the coast of Ylin.

SEMERARA GROUP.

Caluya.—Anchor may be cast to the north of the island of Caluya, in the large cove of this name.

The other ports and anchorages of the group are not especially important.

CALAMIANES GROUP.

Borac.—The port of Borac, in the island of Busuanga, is extensive and sheltered.

CAPES AND POINTS.

NORTH COAST OF MINDORO.

Calavite.—Cape Calavite is well known among mariners, because it is on the point of the island which extends farthest into the China Sea.

Following the coast from Point Calavite toward the east there are found successively the points of Binuangan, Monte or San Tomas,

Bagalayag, Bacto, Baguio, Minolo, Escarceo, Boaya, Calupan, Bisayan, Lubang, Balete, Calapan, Anaganahao, Tagusan, Balingauan, Anahaoan, Dayap, and Dumali.

EAST COAST.

From Point Dumali, situated to the northeast of the island, going down toward the south there are to be mentioned points Pinamalayan, Balete, Mayllague, Bongabon, Dayagan, Ticlin or Alaya, Mansiol, Colasi, Bayallao, and Pandan.

SOUTH COAST.

Points Buruncan, Canimanet, and Tambilambi.

WEST COAST.

Points Pantocomi, Marigil, Tubile, Caranisan, Manburao, Talabasi, Sablayan, Dongon, Lumintan, and Busuanga.

MARINDUQUE.

The following are the points of Marinduque: San Andres, Silangan, Panumitangan, Datinuana, Cauit, Catalo, Suban, Marlanga, Panique, Cabuyoc, Cagpoc, Salomague, Tasa, and Trapichihan.

LUBANG GROUP.

Tilig, Naguionca, Pinagdagayan, Nanoc, Tumbaga, and Antucao are the principal points of this group.

YLIN GROUP.

In the Ylin group, those of Ylin and Calanyanan.

ISLAND OF SEMERARA.

Points Tungao, Tabonan, Macapdos, Talisay, Pasal, and Alimanda.

ISLANDS OF BURIAS, MASBATE, AND TICAO.

BAYS AND COVES.

In the canal which extends between Burias and Busin there are some bays which afford good anchorage. The bay which opens upon the eastern coast, south of Point Tinamandagan, 5 miles from the port of Busainga, is worthy of mention. The small bay of Alimango, which is quite deep, is on the western coast.

MASBATE.

The northern coast of Masbate has a number of bays affording good anchorage.

Asid.—The bay of Asid, situated between Point Pulanauta on the west and Point Bary Chico on the east, is the most important one of Masbate.

TICAO.

Taguan.—The cove of Taguan lies 7½ miles southeast of Punta del Diablo (Devil's Point).

Ticao.—The bay of Ticao is 5½ miles south of the port of San Jacinto.

Biton.—The cove of Biton opens 3 miles south of the bay of Ticao.

PORTS AND ANCHORING GROUNDS.

BURIAS.

Busin.—The port of Busin is formed by the northern end of Burias and the island of Busin; it is merely a deep channel.

Busainga.—The port of Busainga opens 3½ miles southeast of the port of Busin, and is also formed by a channel.

MASBATE.

Barrera.—The port of Barrera is very large, and affords safe anchorage.

Magdalena.—The port of Magdalena is situated 9 miles south of the foregoing one.

Palanog—The port of Palanog opens 6 miles southeast of the port of Magdalena; it is small, but deep, and is protected against all winds.

TICAO.

San Miguel.—The port of San Miguel is situated at the northern end of the island.

San Jacinto.—The port of San Jacinto is situated 3 miles south of the cove of Taguan, and opens eastward with good anchoring ground. In the times of Acapulco this port was a stopping place for vessels.

POINTS.

BURIAS.

Among other points there are on the island of Burias the following: Norte or Colorada, Cueva, Guinduganan, Sur, Tinamandagan, and Dapdap.

MASBATE.

On the island of Masbate there are the following principal points: Bugui, Unutat, Mariveles, Camasusu, Jintotolo, Pulanauta, Pangcanauay, Jangan, Bato, Balabao, Bary Chico, Naindain, Nauco, Caduruan, del Este, Malibago, Tiguijan, Tabunan, Marintoc, Sagausauan, Bagubaud, Capandan, and Colorada.

TICAO.

Ticao has the following points: San Miguel, Noroeste, Talisay, Niladlaran, Lagundi, San Rafael, Lagan, and Tasiran.

CHAPTER II.

BISAYA ISLANDS.

ROMBLON ARCHIPELAGO.

PRINCIPAL ISLANDS OF THE GROUP.

The principal islands of the Romblon Archipelago are the islands of Romblon, Tablas, Banton, Maestre de Campo, and Sibuyan.

BAYS AND COVES.

From the islet of Bagud, southwest from the port of Romblon, the coast runs 2½ miles southward, forming three small coves, of which the first two are of no importance, and the most southerly one is fairly good. From this last the coast runs in a south-southeast direction and forms two other coves.

SIBUYAN.

Magallanes.—The cove of Magallanes is comprised between the points of Consumala and Cang-ouac, the river Nailog pouring into its center.

Lubug.—The bay of Lubug is situated northeast of the island.

BANTON.

The island of Banton possesses three good coves, one on the eastern coast, one on the northeastern, and another small one on the western coast.

TABLAS.

On the island of Tablas, from Point Origon to the cliffs on the side of Mount Noroeste, two coves are formed, and also another south of said cliffs.

Calaton.—The cove of Calaton is formed by the point bearing the same name, by the islets lying 2 miles south-southwest, and by a small point of hidden rocks on the north.

Tabolotan.—The cove of Tabolotan is situated directly south of the northeastern point of Tablas.

PORTS AND ANCHORING GROUNDS.

ROMBLON.

The port of Romblon, one of the best of Bisayas, is situated northeast of the island bearing the same name. The island of Lugbung, situated at a short distance from this port, defends its two sheltered and deep anchoring grounds.

TABLAS.

Odiungan.—The harbor of Odiungan is situated southeast of the cove which is formed by Point Bagulayan on the western coast.

Loog.—On this same western coast is the port of Loog, between two points which are very close to each other and are on the same meridian.

Sabang.—Sabang is a small port situated north and west of Calaton Point on the western coast.

MAESTRE DE CAMPO.

Southwest of the island of Maestre de Campo there is a sheltered harbor protected against all winds except the southwesterly ones.

POINTS.

ROMBLON.

The following points are to be found on the island of Romblon: Tongo and Lantian on the north; Cabog, Naya, and Sablayan on the east; Apunan on the south, and San Pedro and Bombon on the west.

TABLAS.

On the island of Tablas there are the following points: Calaton, Cervera, del Este, and Pineda on the east; Origon on the north; Sangilan, Bagulayan, Cabaccongan, and Inanayan on the west, and el Sur or Cabalian on the southern end of the island.

MAESTRE DE CAMPO.

The point of La Concepcion on this island is worthy of mention.

SIBUYAN.

The principal points on the island of Sibuyan are: Ipil, Bayarin, Cang-ouac, Canglonbog, Consumala, and Padulog, all along the southern coast; on the eastern coast, Majiuat, Cambulayan, Cambijan, and Canjalon; on the southern end of the island, Point Cauit; and on the western coast, Cansapal, Apiat, Bolabos, and Agutay.

PANAY AND ADJACENT ISLANDS.

BAYS AND COVES.

NORTHERN COAST OF PANAY.

Naisot.—The cove of Naisot is comprised between points Ibajay and Sigat or Mabgaran.

Pontud.—The so-called bay of Pontud is situated opposite the bank of Pontud and is comprised between points Sigat and Apga-Sapian.

Sapian.—The cove of Sapian opens between Point Baquiao and the land strait of Sapian.

Capiz.—The cove of Capiz, also called Capiz Harbor, is comprised between Point Nailon on the west and Point Colasi on the east.

From Point Nagtig to Point Bulacaue a large bay of more than 18 miles in length and 9 miles in width is formed toward Mount Agudo.

EASTERN COAST.

Bancal.—The cove of Bancal runs from the cliffs of Cambaloton south-southeast of point Bulacaue to point Gogo, which is situated 4½ miles more to the south.

There are various unimportant coves to be found from point Gogo to the Tugil "Silanga."

Balad.—The cove of Balad would be the principal one of these were it not obstructed by hidden rocks.

The bay which is formed to the west of the island of Tagubanhan, on the coast of Panay, is an important one.

The bay of Canas is the most important one of those which are to be found on the eastern coast of Panay.

WESTERN COAST.

South of Point Dalipe there is a cove of fair conditions.

Pandan.—The cove of Pandan is almost the only one which may be called such on the western coast of Panay. It is formed south of the promontory of Naso, and is situated between points Pucio and Lipata; it is clear, has steep banks, depth of waters, and is not sheltered.

ISLAND OF GUIMARAS.

Igan.—The bay of Igan opens south of the port of Santa Ana and contiguous to it, on the island of Guimaras, and is situated between Point Ganga on the north and Point Guinad on the south, and is the most important one on this island.

PORTS AND ANCHORING GROUNDS.

NORTHERN COAST OF PANAY.

Batan.—The port of Panan is situated 10 miles southeast of the bar of Acdan; it is deep, but the entrance to it is bad.

Capiz.—The harbor of Capiz may be either the one which is opposite to the church of the village of Capiz, or the one which is opposite to the bar of the river.

EASTERN COAST.

Estancia.—The harbor of Estancia is situated north of the Bayas.

Iloilo.—The harbor of Iloilo is situated between the two bends formed by the river at its mouth.

WESTERN COAST.

Buruanga.—On the coast comprised between points Naisog and Pucio there is another point called Point Batuit, which separates two small harbors; that of Buruaga is the better.

San Jose de Buenavista.—The harbor of San Jose de Buenavista is situated south of Point Dalipe.

ISLAND OF GUIMARAS.

Santa Ana.—The port of Santa Ana is a small port, clear and deep, opening to the west.

POINTS.

NORTHERN COAST OF PANAY.

All along the northern coast, from west to east, are to be found in succession points Naisog, Tabun, Saboncogon, Tabicu, Ibajay, Sigat or Mabgaran, Apga, Aclan, Nailon, Colasi, Nipa, Pirara, Pinalabuan, and Bulacaue on the northeastern end of the island.

EASTERN COAST.

On the eastern coast points Gogo and Tabunan are worthy of mention.

SOUTHERN COAST.

On the southern coast points Mulactin, Bugnayon, Caducdula, and Siaran are worthy of mention.

WESTERN COAST.

Commencing at the southwestern end of the island and continuing toward the north the following points are to be found in the order as named: Naso, Aniniy, Jagdan, Mapatag, Tubigon, Dalipe, Lipata, Pícol, and Pucio.

ISLAND OF GUIMARAS.

On the island of Guimaras the following points are worthy of mention: Cabugao on the north, Lusaran on the south, and Ginad, Ganga, Bondulan, and Cabulic on the west.

ISLAND OF NEGROS.

BAYS AND COVES.

NORTHERN COAST.

On the northern coast of Negros there is scarcely any cove worthy of being mentioned. The so-called Saco de Negros is formed on the north of the island, and is bounded on the west by the group of the island of Pan de Azucar and the southern part of the group of Gigantes, and on the east by the island of Bantayan and the chain of small islands which, starting from the last named, runs southwest to the northeastern end of Negros.

EASTERN COAST.

A cove of fair depth extends from Point Ocre to Point Ticlin. At a distance of 1½ miles north from Point Ticlin the coast forms another small cove, with an islet in front of it.

Bais.—The cove of Bais—that is to say, the one which is opposite the Bais islands—is comprised between Points Teca on the north and Canamay on the south.

Capcap and Tutuban.—The coves of Capcap and Tutuban are situated on the southern end of the island. They are small, but possess good conditions.

SOUTHWESTERN COAST.

Tolon.—The spacious cove of Tolon runs between points Cauitan and Cansilan.

Compomanes.—The cove of Compomanes opens south of Point Matutindog and next to it.

Nabulao.—The cove of Nabulao is situated south of the preceding one, at the mouth of the river of the same name.

Catmon.—The bay of Catmon is situated between points Catmon and Bacuyangan.

Sipaluy and Cartagena.—The coves of Sipaluy and Cartagena are situated next to that of Saban.

Linaon.—The bay of Linaon opens between points Sojoton and Maguiliquian.

WESTERN COAST.

Only the large bend formed on this coast south of the island of Guimaras and which ends at Point Sojoton is worthy of mention.

PORTS AND ANCHORING GROUNDS.

NORTHERN AND EASTERN COASTS.

There are on the northern and eastern coasts of Negros some unimportant harbors.

SOUTHERN COAST.

Siyt.—The port of Siyt is situated on the southern end of the island; it is small, but clear, with good anchoring grounds, and sheltered.

Bombonon.—The port of Bombonon opens at about 2 miles southwest of the port of Siyt, on the southern end of the island.

Tolon.—In the river or cove of Tolon vessels of light draft can anchor at high tide.

POINTS.

NORTHERN COAST.

The principal points on the northern coast are: Points Guimugahan, Talisay, Sagay or Carey, and Panagsagon, on the northwestern end of the island.

EASTERN COAST.

On the eastern coast there are the following points: Bito, Mucabog, Ocre, Ticlin, Tabon, Jilaitin, Panay, San Jose, Tayasan, Manjuyod, Palompon, Canamay, Amblan, Tayba, Sibulan, Dumaguete, Bacong, Dauin, Magabo, Zamboanguita, Liza, Siyt, and Bombonon.

SOUTHERN COAST.

On the southern coast are: Point Siaton, the southernmost one on the island; Cauitan, Cansilan, Matutindog, Sanque, Taliptipan, Balatong, Doog, Bolila, Catmon, Bacuyangan, Luinbia, and Obon.

WESTERN COAST.

On the western coast are Points Manoban, Maguiliquian, Sojoton, Gabambalang, Bula, Bilad, Calasian, Bacong, Magsalin, Maquiliquili, and Tomanton.

ISLAND OF CEBU.

BAYS AND COVES.

EASTERN COAST.

Bago.—The cove of Bago is situated 13 miles south-southeast of Point Bulalaqui. It is formed by a bend made by the coast, which runs toward the east with Point Nailon.

There are also to be found inflections of the coast on the north of Point Bantolinao, between Points Sacaan and Catmon; north of Point Danao, between Points Cotcot and Bagacay or Liloan; on the northwest of the island of Mactan, south of Cebu, between Points Carcar and Sibonga, and south of Point Dalaguete.

WESTERN COAST.

Daijagon.—The bay bearing this name is comprised between Point Daijagon on the north and Point Magtulinog on the south.

Tuburan.—The cove of Tuburan, of little importance, is 5½ miles distant south-southwest of the cove of Batauan.

Languyon.—The bend or small cove of Languyon is 1 mile south of Point Tuburan.

Balamban.—The cove of Balamban opens south of the Point of Balamban.

Calavera.—The cove of Calavera is a small cove south-southwest of the cove of Balamban.

Pinamungajan.—The small cove of Pinamungajan is halfway between Points Tajao and Gorda.

Barili.—The cove of Barili is 3½ miles south-southwest of Point Gorda.

Badian.—The cove of Badian is situated between the peninsula of Copton and another point of land which advances about 2 miles also to the north, called Point Badian.

Matutinao.—The cove of Matutinao is situated between Point Badian on the north and Point Guiuanon on the south, the distance between these being 6 miles.

PORTS AND ANCHORING GROUNDS.

EASTERN COAST.

Bugut.—The small port of Bugut is nearly on the north, 3 miles distant from Point Caladman.

Cebu.—The harbor of Cebu is situated south-southwest of the fort of Cebu.

Cauit.—The port of Cauit opens on the cove of Cauit toward the north.

Tinaan.—The harbor of Tinaun is situated 11 miles southwest of Cebu.

Carcar.—At the bend of Carcar there is a fairly good, small port.

Boljoan.—The port or harbor of Boljoon is situated at the bend of this same name.

Canoan.—The port of Canoan is formed at the cove of Canoan. It is sheltered from all winds except the winds from the northwest to the west.

WESTERN COAST.

Batauan.—The port of Batauan is a little more than 2 miles distant south of the river Jaligue.

Buenabrigo.—On the southern side of the point of this name vessels can find sufficient shelter when at anchor.

Calavera.—Vessels can also find anchorage in the cove of this name.

Badian.—There is an anchorage south of the island in the cove of the village of Badian.

POINTS.

Along the eastern coast, from the northern end, there are the following points: Bulalaqui, Campatoc, Malontod, Tindug, Nailon, Maitum, Ulud, Pamoboan, Bantulu or Bantolinao, Manayaosayao, Jimuguit Sacaan, Catmon, Panalipan, Binuncalan, Danao, Lusunsacatao, Bandiloan Cotcot, Bagacay or Liloan, Cauit, Lipata, Panguian (island of Mactán), Tinaán, Minaga, Carcar, Sibonga, Simala, Argao, Balatic, Dalaguete, Bugo, Ilijan, Samang, Cayangon, Landugan, Oslob, and Tanon, southwestern end of the island.

WESTERN COAST.

The principal points on the western coast, commencing at the north, are: Tapilon, Bantique, Cauit, Isabel, Mancao, Aniningan, Tagjalique or Jaligue, Batauan, Bagasaue, Languyon, Carmelo, Jinampangon, Bagacaua, Buenabrigo or Guinabasan, Uag, Balamban, Buanoy, Jinolauan, Tajao, Gorda, Japitan, Palalon, Jacbas, Minalos, Bitoon, Tanguil, Dumanjuc, Copton, Tongo, Badian (Bilambilam), Guiuanon, Bulalacao, Malboc, Looc, Colasi, and Liloan, on the southern end of the island.

BOHOL AND ADJACENT ISLANDS.

BAYS AND COVES.

NORTHERN COAST OF BOHOL.

The northern coast of this island is very dangerous, as it is nearly all obstructed by the coral banks of Danajon.

EASTERN COAST.

Tintiman.—The cove of Tintiman is formed west of the island bearing this name.

Coblon.—The cove of Coblon opens north of the peninsula of Pugatin and contiguous to it.

Guindulman.—The small peninsula of this name forms at its southern part the cove of Guindulman.

SOUTHERN COAST.

On the southern coast there are formed at the mouths of the rivers small coves, which are of no importance.

Guinaguanan.—This cove is formed by the western point of the mouth of the river Loay.

WESTERN COAST.

Maribojoc.—The cove of Maribojoc is formed by a bend of the eastern coast of Point Cruz.

Catagbacan.—The cove bearing this name is formed by the islands of Cabilao, Sandingan, Calape, and part of the coast of Bohol.

ISLAND OF PANGLAO.

Panglao.—The cove of Panglao is situated southwest of the island of Panglao.

ISLAND OF SIQUIJOR.

Canoan.—The cove of Canoan, on the island of Siquijor, which we consider as the group of Bohol, is situated 3 miles south of Point Sandugan. It is the principal one of this island.

PORTS AND ANCHORING GROUNDS.

ISLAND OF BOHOL.

Calape.—The small port of Calape is situated on the most southerly part of the cove of Catagbacan, formed by the islands of Calape and of Bohol.

Laon.—Vessels can anchor at the so-called Muelle de Laon, in the cove formed by said Muelle together with the island of Sandingan.

The southern coast of Bohol has many bends which can serve as anchoring grounds, although the entrance thereto is difficult. Vessels can also anchor in the coves of Guindulman and Coblon.

POINTS.

ISLAND OF BOHOL.

The following are the principal points in the island of Bohol: Corte, Tabigui, Amol, and Acha on the north; Libas, Namuco, Agio, Quinal, and Napacao on the east; Cabantian, Nauco, Campao, Cantagay, Gorda, Magay, and Loay on the south, and Cruz and Lauis on the west.

ISLAND OF PANGLAO.

On the island of Panglao the most noteworthy points are: Catadman, Biquin, Bolud, Tahuruc, and Duljo.

ISLAND OF SIQUIJOR.

The most noteworthy points on the island of Siquijor are: Canoan, Sandugan, Lumancapa, and Lumango on the north; Tubintin, Daquit, and Minatulan on the east; Tonga and Basigajen on the west, and Cambalaguio, Bagacay, and Canaba on the south.

SAMAR AND ADJACENT ISLANDS.

HARBORS, BAYS, AND COVES.

NORTHWESTERN AND NORTHERN COASTS OF SAMAR.

Tinagutman.—This cove is situated 2 miles from the river Mobo.

Balicuatro.—The cove of Balicuatro is formed between the point bearing that name on the west and the point surrounded by hidden rocks, which is 7 miles distant to the East.

Laguan.—The cove of Laguan is situated between Point Libas and the western coast of the island of Laguan.

EASTERN COAST.

Gumay.—The so-called cove of Gumay is situated between points Lila on the north and Alibangbang on the south.

Oras.—The cove of Oras is west of Point Tiguias.

Ipil.—Near the place called Ipil a small bay opens, formed by points Casangayan on the north and Tambadon on the south.

Sulat.—The cove of Sulat is 6 miles distant from the foregoing one.

San Julian.—Near the south of Sulat is the cove or bay of San Julian.

Borongan.—The cove of Borongan is south of the foregoing one.

Bayacan.—The cove of Bayacan is some 3 miles south of Borongan.

Pambujan.—The splendid bay of Pambujan is situated between points Bura and Matarinao.

SOUTHERN COAST.

There are several bends at the end of the island, the most remarkable of which is that of Guiuan. In the direction of the west-northwest there are others of less importance as far as the Bay of San Pedro and San Pablo.

WESTERN COAST.

Beyond the strait of San Juanico, toward the north, are the bays of Laguin, Villareal, and Cambutatay, the harbor of Maqueda, and the cove of Calbayog.

Laguin.—The bay of Laguin opens east of the southern end of the island of Daram.

Villareal.—The bay of Villareal extends toward the northeast of the foregoing.

Maqueda.—The bay of Maqueda extends into and toward the northeast of the island of Buad.

Cambutatay.—Northwest of Catbalogan is the bay of Cambutatay.

Calbayog.—South of this village there is a bend or cove northeast of the island of Limbancauayan.

CAPES AND POINTS.

NORTHERN COAST OF SAMAR.

From west to east there are: Points Sacalagayan, Simoga, Balicuatro, Malubaroc, Bugtu, Oot or Lauigan, Caradapat, Ocan or Binay, Maujud, Sila, Pagsanhan, Alibangbang, Pangpang, Binugayan, and the cape of Espiritu Santo.

EASTERN COAST.

From north to south there are the following points: Tiguias, Ugbun, Casangayan, Tambadon, Tugasan, Sulat, Cambista, Paninihian, Anito, Sorongon, Guinanuc, Capines, Anitagipan, Tabay, Haba, Panadlihan, Bura, Matarinao, Burac, Asgad, Pinanamitan, Hognaya, Bagton, Bauas, and Sungi, at the southern end.

SOUTHERN COAST.

From east to west the following points are worthy of mention: Banago, Pamanpangon, Cabanian, Baras, Bobon, Cabarasan, Higoso, Sua or Dapo, Paglalaongan, Capines, Amangbuale, Cabalagnan, Odoc, Panay, Guintulan, and Tingib.

WESTERN COAST.

From the southern entrance of the strait of San Juanico, in a northerly direction, are points Binuntuan, Cabugauan, Dalugdug, Manalumo, Binatac, Cujao, Irong-irong, Hibatan, Tactac, Malayoc, Maglalabon, and Polauit, near the northwestern end.

ISLAND OF DARAN.

The most important points on this island are: Guindauan on the north; Cauayan, Madang, Tanagon, Catangdan, Amantarong, Asug, and Campilipa on the east; Remintao, Bacjao, Halaba Guinlatuyan, Cabadiancan, and Cananyong-Daco on the west.

LEYTE AND ADJACENT ISLANDS.

HARBORS, COVES, AND BAYS.

EASTERN COAST.

Panaluran.—The beautiful cove of Panaluran is formed by the northern coast north of the small peninsula of Tacloban.

Cancabato.—The cove of Cancabato is south of Tacloban.

San Pedro and San Pablo.—The great harbor of San Pedro and San Pablo is one of the most capacious of the archipelago. It is formed by the southwestern coast of Samar and the eastern coast of Leyte.

Camiris.—The cove of Camiris is situated north of Tanauan.

Jaclugan.—The bay of Jaclugan is formed by the coast and a small peninsula which extends from south-southwest to north-northeast, east of Tanauan.

Hinunangan.—The cove of Hinunangan opens south of the islands of Cabugan Grande and Cabugan Chico.

SOUTHERN COAST.

Sogod.—We call by this name the deep and spacious cove which opens south of Leyte, between points Taancan or Ninipo on the west and Mangayao on the east, on the Strait of Panaon.

WESTERN COAST.

Tabin Chico and Tabin Grande.—The small coves of Tabin Chico and Tabin Grande are separated by a small tongue of land which lies 9 miles south of the northwestern end of Leyte.

Tabango and Campopo.—The bays of Tabango and Campopo are at a distance of about 6 miles south of the foregoing.

Dupon.—The Bay of Dupon is situated between Point Sacay-Sacay on the northwest and Point Catiyoman on the southeast.

Siapon.—The cove of Siapon opens 1½ miles east of the bay of Dupon.

From Siapon the coast runs southward without any noticeable inflexions, with the exception of the bends of San Agustin, Baybay, Inopacan, Hilongos, and Cajagnaan, and that of Maasim on the southwest.

ISLAND OF BILIRAN.

The bays and coves of importance in the island of Biliran, situated north of Leyte, are those of Biloan, Baganito, Inansugan, and Capalis.

PORTS AND ANCHORING GROUNDS.

COAST EAST OF LEYTE.

Liloan.—The port of Liloan is formed by the northern point of the island of Panaon and the southeast of Leyte.

The harbors and ports which are to be found on the cove of Panaluran or port of Tacloban are very good, as are also those on the cove of Cancabato, on the cove of Hinunangan and specially so the one on the large cove of Sogod.

WESTERN COAST.

Palompon.—The port of Palompon opens 14 miles south of Point Liglio.

Dupon.—There is good anchorage in the bay bearing this name.

Siapon.—There is also good anchorage in the bay of Siapon.

Bello.—Port Bello opens on the western part of the bay of Ormoc.

NORTHERN COAST.

The northern coast of Leyte has been very imperfectly surveyed. It is probable that there are good anchoring grounds in the various bends of the large bay of Carigara.

ISLAND OF BILIRAN.

Biliran.—Vessels can anchor off this island at a distance of half a mile, opposite to the village of Biliran Nuevo.

POINTS.

NORTHERN COAST OF LEYTE.

All along the northern coast from west to east there are the following points in succession: Rabin or Caruyucan, Villalon or Sugboncogon, Uson, Manoc, Bacjao, Bulacahui, Talairan, Pinagmupuan, Antipolo, Canumbao, Halaba, Baluarte, Odbo, Can-apug, Calugupan, Calbayogos, and Majinasu.

EASTERN COAST.

On the eastern coast the following are noteworthy, from north to south: Canotoc, Uban, Cauayan, Panirugan, Cataisan, Camiris, Amban, Marigatdan, Vigia, Liberanan, Tagbuc, Salacot, Taytay, Hinunucan, Odiong, Laguma, Patyacan, Bandan, Malagusan, Sua, Hitumnog, and Marangay.

SOUTHERN COAST.

The southern coast is the one which most abounds in points. Among them are specially worthy of mention Points Mangayao, Bantigui, Naglon, Malatag, Lubo, Mayuga, Cauayan, Jubas, Cataluan, Calapocan, Magalo, Hoangon, Sahuaon, Tamulayog, Taancan or Ninipo, Cantutuy, Higanligam, Bato, and Ubay.

WESTERN COAST.

On the western coast there are worthy of being mentioned, going from south to north, Points Panno, Taguus, Cantoto, Uman, Pontod, Calinauan, Cauampit, Bitanjuan, Panalian, Biasong, Nabanoc, Pagtail, Baglit, Bari, Sacay-Sacay, Bislutan, Duljugan, Binagmaan, Canauayan, Linganay, Pamangpangon, Quiohag, Can-apug, Blanca, Liglio, Bagajupi, Tugas Sangubon, Matungo, Daja-Diotay, Daja-Daco, Bagorayray, and Dungun.

ISLAND OF BILIRAN.

The island of Biliran has the following points: Pontado, Himbuegan, Mapuyo, Anas, Mambajab or Amangbahan, Mariquit, and Tanjas on the northern coast; Jabujab, Gamay, and Pauican, or Masog, on the eastern coast; Nuluncan, Matuntun, or Macogtong, and Magbugun, on the southern coast, and Catmon, Sabang, Bagonbog, Acta, and Sulung, on the western coast.

ISLAND OF PANAON.

The island of Panaon has also some remarkable points, such as Calapina, Caligangan, Bahag, Maoyo, Quinanad, Pinaghaua, Pinutan, Cainguin, Buhisan, Bilatan, and Botobolo, on the eastern coast; Caybiran, Dinid, and Inolinan, on the southern coast, and Cogon, Panaon, Mabauha, Ilihan, Maclayauas, Bahay, and Cado-Ocan, on the western coast.

CHAPTER III.

MINDANAO AND ADJACENT ISLANDS.

MINDANAO.

BAYS.

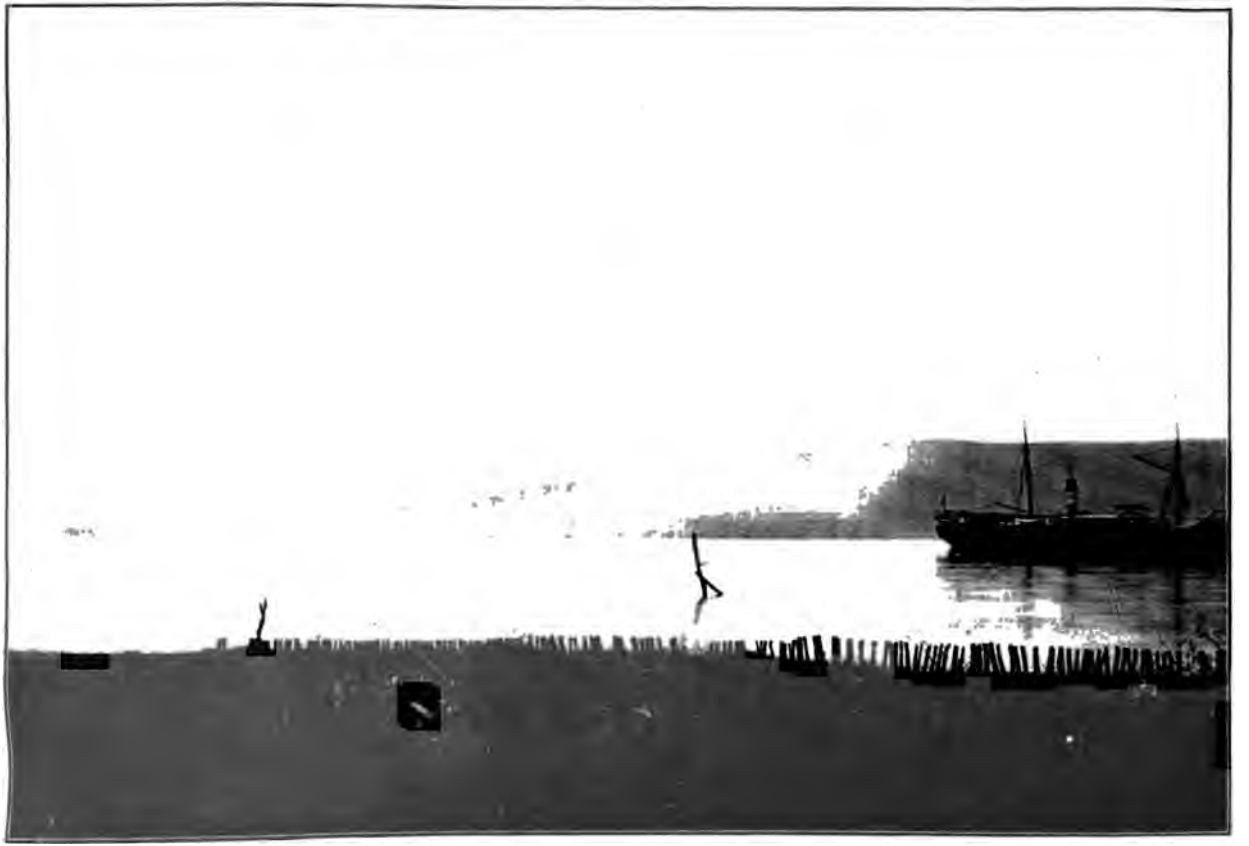
Butuan.—The bay of Butuan is a spacious bay, opening to the north. It is 21 miles wide and is situated between the lands of Madilao and Point Dinata. It is one of the best bays of Mindanao.

Macajalar.—That of Macajalar is a vast open bay on the northwest, and is situated between Points Gorda and Sulauan.

Iligan.—The magnificent bay of Iligan is a gulf, rectangular in shape, and opens exactly to the north.

Panguil.—That of Panguil runs inward toward the southwest of the gulf or bay of Iligan.

Great Bay of Illana.—The Great Bay of Illana extends from Point Flechas as far as Point Quidapil, southwest of Cotabato. It is the



BAY OF PUJAGA (MINDANAO).

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largest bay of Mindanao. It comprises the bays of Matubug, Pagadian, Sigayan, Marga, and Caromata on the north, and those of Barras, Matimus, Lusayen, and Paranparan on the east.

Sarangani.—The bay of Sarangani runs southward into the southernmost peninsula of Mindanao.

Pujaga.—The bay of Pujaga, one of the best of the whole archipelago, is situated some 35 miles north of the Cape of San Agustin. It has about 10 miles in its greatest length from southeast to northwest, and is about 5 miles at its widest part.

COVES AND BAYS.

NORTHERN COAST.

Murcielagos.—The cove of Murcielagos, which is very deep, opens between Point Bombon on the east and Point Silla on the west.

Dapitan.—The bay of Dapitan is situated between Point Tagolo on the north and Point Sicayab on the south. It is 2 miles wide at its entrance and runs inward about 3 miles in a southwesterly direction.

Gran Ensenada.—This name is given to the cove comprised between Points Sicayab and Blanca.

Dauigan.—The cove bearing this name is comprised between Points Dauigan and Tabonan.

Sindangan.—The bay of Sindangan is bounded on the east by Point Dauigan and on the west by Point Sindangan.

WESTERN COAST.

An important bay opens between Points Dulunquin and Piacan, about 17 miles south of the port of Santa Maria.

Sibuco.—The bay of Sibuco extends between Simbaguán and Pangman, about 25 miles north of Zamboanga.

SOUTHERN COAST.

Masingloc.—After turning the peninsula of Zamboanga toward the east and going along the coast of said peninsula, one finds south of Manicahan or Manicaan the small cove of Masingloc, west of the islands of Malanipa and Saccol. Inside of this bend is situated the small island of Vilanvilan.

Sibuguey.—From the small bay of Masingloc the coast of Mindanao runs 53 miles to the north-northeast, and then turning it advances about 30 miles toward the south, forming the spacious bay of Sibuguey, which ends on the southeast at the island of Olutanga. The coasts of this bay are formed by a great many islands, and its points contain small ledges of hidden rocks.

This bay has various bends or partial coves which are little known.

Vitali or Bungao.—North of Point Vitali there opens a cove, which we call Vitali or Bungao, toward the middle of the eastern coast of the peninsula of Zamboanga.

Dumanquilas.—The bay of Dumanquilas is comprised between the southern extremity of the island of Olutanga and Point Flechas or Baganian, about 30 miles east of the bay of Sibuguey. The most important bay it contains is that of Igat.

Tantauang.—The bay of Tantauang is situated south of the peninsula which is formed between the bays of Sibuguey and Dumanquilas.

Tumalung.—The bay of Tumalung opens north of the island of Olutanga. It is sheltered and has a good depth.

Malicay.—The bay of Malicay is formed by Point Dumanquilas and the peninsula which ends at Point Flechas.

Matubug.—The bay of Matubug is formed by Point Tambulian on the south and Dapulisan on the north.

Linao.—The bay of Linao extends from Point Quidapil to Point Lebac.

Tuna.—The cove of Tuna opens at about 6 miles south of Point Lebac.

Casilaran.—The magnificent bay of Casilaran is situated on the western coast of the large bay of Davao, after turning Point Calungan.

Davao.—The large bay of Davao is comprised between Point Calian, on the eastern coast of the peninsula of Sarangani, and Point or Cape San Agustin, on the southern extremity of the peninsula of this name. It contains various coves or bends, among which is specially worthy of attention the one which opens on the western coast of the island of Samal, situated in the center of said bay.

EASTERN COAST.

After turning Cape San Agustin and going along the eastern coast of Mindanao in a northerly direction one finds several bays, among which the following are worthy of special mention:

Mayo.—The bay of Mayo is situated near the bay of Pujaga, on the northeast, between Point Lamigan on the south and Point Tugubum on the north.

Yucatan.—In the interior of the bay of Mayo and near Point Tugubum the cove of Yucatan opens.

Caraga.—The cove of Caraga is found after turning Point Pusan.

Baganga.—The cove of Baganga runs inward from Point Daguet to Point Lambajon.

Bislig.—The cove of Bislig is comprised between Point Tagtaba on the south and Point Maslic on the north. The islet of Masaburon divides the entrance of the cove into two channels.

Lianga.—The cove of Lianga is comprised between Point Baculin on the south and Point Umanun on the north, which points are at a distance of 8 miles from each other. Other coves open south of Point Lambillon and between Tandag and Point Cauit, but they are of no importance.

PORTS AND ANCHORING GROUNDS.

Bilanbilan.—The harbor of Bilanbilan is 1 mile south of Point Surigao. This is a very small port. A cove, opened at the north and comprised between Point Bilanbilan and the most northerly point of Mindanao, can also serve as anchoring ground.

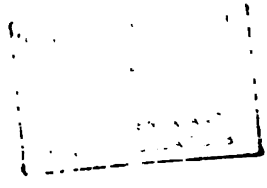
Nasipit.—The small port of Nasipit is situated south of the Bay of Butuan, near the river of the same name.

Balingasag.—The harbor of Balingasag is north of Point Gorda and next to it.

Cabulig.—The harbor of Cabulig opens south of Point Gorda and north of the town of Jasaan, on the Bay of Macajalar.

Cagayan.—The harbor of Cagayan is northeast of the mouth of the River Cagayan, at a distance of half a mile.

PORT OF CALDERA (ZAMBOANGA).



Opol.—The harbor of Opol is 5 miles west of the bar of the River Cagayan.

Alubijit.—The harbor of Alubijit is 7 miles northwest of the harbor of Opol.

Misamis.—The port of Misamis opens at the entrance of the bay of Panguil, southwest of the bay of Iligan.

Loculan.—The harbor of Loculan is situated between the two mouths of the river Loculan in the bay of Panguil.

Dapitan.—The port of Dapitan is opposite the town of this name, on the bay called also Dapitan.

Talaguilong.—The port of Talaguilong is situated between the town of Dapitan and Point Tagolo.

El Caracol.—The Caracol is a small port in the shape of a snail, north of the river Dapitan and close to it.

Dauigan.—The harbor of Dauigan is on the bay of this name.

Banigan.—That of Banigan is situated south of Point Banigan.

WESTERN COAST.

Santa Maria.—The well-sheltered port of Santa Maria is situated south of Point Bulangolan and close to it.

Caldera.—The port of Caldera is situated near the town of Ayala, on the southern extremity of the peninsula of Zamboanga; it is small and of little depth, but very well sheltered.

San Mateo.—The harbor of San Mateo is situated between the port of Caldera and Zamboanga.

SOUTHERN COAST.

Zamboanga.—The harbor of Zamboanga is one of poor conditions on account of its bottom being formed of large rocks. It extends north of the islands of Santa Cruz.

Masingloc.—The excellent harbor or port of Masingloc goes inward about 3 miles north of Point Mariqui. It affords excellent shelter when high seas are feared, due to the northern hurricanes peculiar to the Philippine Islands.

Banga.—The port of Banga lies back of the cove of this name.

Bolong and Coruan.—There are anchoring grounds opposite the two towns named, the better being that of Coruan, which is very well sheltered by the islands of the Panubigan group.

Sambulauan.—The port of Sambulauan lies beyond Point Tambatan, on the cove of Matubug.

Sangarayan.—The island bearing this name, lying south of the northern point of the cove of Matubug, together with some hidden rocks at the entrance of said cove, afford fair anchoring grounds.

Tucuran.—The harbor of Tucuran is west of the mountain of this same name.

Baras.—The harbor of Baras, on the cove of this name, is formed by the island of Ibus and the coast.

There are also anchoring grounds between points Matimus and Tagapangan.

Polloc.—The magnificent port of Polloc, situated east of the bay of Illana, is comprised between Point Mariga-bato on the south and Point Tagapangan on the north. It runs 5 miles in to the east, and together with the northern coast it forms the bays of Quidancaco and Sugut,

while with the southern coast it forms a still larger bay, within which is situated the naval establishment of Polloc. That of Paran-paran is on the western part of this bay. Sounding at the entrance of the bay shows a depth of over 70 meters, and inside of it there is a depth of from 30 to 50 meters.

Cotabato.—The harbor of Cotabato is situated on that part of river Pulangui which is opposite the town of this name. It has 5 meters of water.

Linao.—The harbor of Linao is in the bay of this name.

Mati.—The harbor of Mati is in the bend formed by the cliffs of Point Tabunao, 11 miles nort of Port Lebac.

Lebac.—This port is formed by points Lebac and Nara.

Basiauang.—The harbor or harbors of Basiauang, which are situated between the cove of Lebac on the north and the cove of Tuna on the south, are the best in this part of the coast.

Timuto.—The harbor of Timuto is north of Point Baluluan and close to it, and west of the entrance to the bay of Sarangani.

Macar.—The harbor of Macar opens to the northwest of the bay of Sarangani and contiguous to it.

Mluc.—The harbor of Mluc is north of point Dimpao, also on the bay of Sarangani.

Marapatang.—The harbor of Marapatang is east of the bay of Sarangani. Its conditions are poor.

Sapo.—The small port of Sapo opens south-southwest of the harbor of Marapatang.

Glan-Masila.—The harbor of Glan-Masila is situated about 3 miles north of Point Sumban, at the eastern end of the bay of Sarangani.

Balangunan.—The harbor of Balangunan lies beyond Point Tinca, in the direction of the east-northeast.

Nuin.—The harbor of Nuin opens 1½ miles north of Butulan.

Caburan.—The harbor of Caburan is north of Point Caburan.

Dung.—The harbor of Dung is at the island of Sarangani, Grande, or Balut-Marila.

Tibal.—This harbor is also situated in the same island, after turning Point Vay toward the west.

Minic.—Minic is a bay and anchoring ground at the end of the same island.

Patuco.—The port of Patuco is the best in the island of Sarangani-Chica and is situated at the northern end of same, 1 mile south of Point Catoan.

Tumanao.—The port of Tumanao is situated about 1 mile south of Point Tian.

Boay.—The port of Boay opens south of the port of Tumanao.

Malalag.—The port of Malalag is situated in the cove of Casilaran, southwest of the bay of Davao.

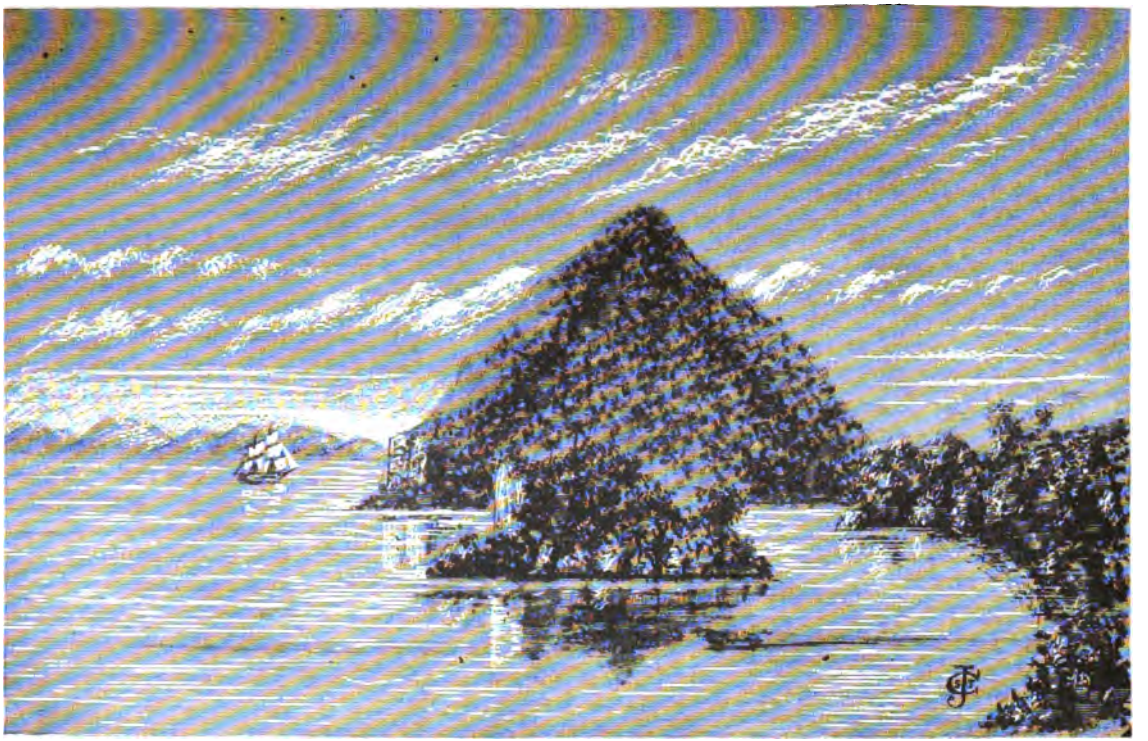
Davao.—The harbor of Davao is situated at more than a cable's length from the coast, beyond the bar of the river toward the north.

Madaum.—The harbor of Madaum is situated near the mouth of the river of this name within the bay of Davao.

Pandasan and Copia.—There is a good anchoring ground, sheltered and protected from all winds between the islands of Pandasan and Copia, situated near the south-southeast of the mouth of the river Hijo.

Matiao.—Five miles S. ¼ E. of Point Lahi is the small cove and anchorage of Matiao.

PLATE V.



POINT SIPACA AND ISLAND OF LAPINIG.

Sigaboy.—The harbor of Sigaboy is opposite the town of this name.

Lanigan.—Two miles before reaching Cape Augustin is the small port of Lanigan, good only for small craft.

Other anchorages can be found in the coves and bends of the bay of Davao.

Malipano.—The harbor of Malipano, a naval station in the bay of Davao, is situated between the small island of Malipano and the island of Samal. Its conditions are good and it is protected by the island of Talicud.

EASTERN COAST.

Luban.—We call harbor of Luban the one which is met before sailing past Point Camamauan coming from the South, and is formed by the islet and Point Luban.

Pujaga.—The bay of Pujaga is one of the best ports of Mindanao.

Macambol.—The harbor of Macambol is situated inside of the bay of Pujaga.

Caraga.—The harbor of Caraga is situated East of the river which bears its name, and it can give shelter to small craft.

Tubu.—Within the cove of Caraga, toward the south, is the harbor of Tubu, a good shelter from the southeast to southwest winds.

Baganga.—East of the town of Baganga is the harbor of this name.

There are to be found other harbors in the various coves and bends formed by this coast as far as the strait of Surigao. They have, however, never been surveyed, neither do they appear to be of any importance.

CAPES AND POINTS.

There are two capes worthy of notice in Mindanao. That of Sarangani or Point Tinaca, at the southern end of the island, and that of San Agustin at the end of the western coast of the bay of Davao.

NORTHERN COAST.

From Point Cauit, the most easterly one of the peninsula of Surigao, along the coast toward the west, there are the following points in the order named: Tugas, Bilanbilan, Nanoc, Bilaa, Bolobolo, Diuata, Sipaca, Gorda, Bagacay, Sulauan, Binuni, Biani, Labo, Tabu, Divalan, Layauan, Polo, Bombaon, Silla, Balalo, Tagolo, Botong, Sicayab, Blanca, Dauit, Tabonan, Sindangan, Dauigan, Banigan, Quipit, Madatog, Panganuran, Gorda, and Coronada.

WESTERN COAST.

The principal points on this coast, commencing with the most northerly one, are: Bulangonan, Dulunquin, Siocon, Siraguay, Cauit, Piacan, Nanga, Batotindoc, Litangan, Alimpaya, Batalampon, Dumalun, and Caldera.

SOUTHERN COAST.

The most important points on the coast of Mindanao, which extends from Zamboanga through the bays of Sibuguey, Illana, and Davao, are the following: Coruan, Lutangan, Taguisian, and Arenas (island of Olutanga), Lapat, Flechas, Tambulian, Tambatan, Dapulisan, Pora, Caliban, Semaruga, Selungan, Lapitan, Salauan, Matimus, Tagapan-

gan, Marigabato, Tapian, Manangula, Lugus, Luput, Linao, Tabunao, Quidapil, Lebac, Nara, Pitas, Basiauang, Tuna, Polo, Bacud, Bul, Baluthan, Panguian, Tinaca, at the southern end of the island; Vay and Tiain on the islands of Sarangani; Sagal, Pampat, Cabusa, Banos, Calian, Lubalan, Tibungoy, Calungan, Pagquiputan, Santana, Bayagua, Lasang, Parara, Lalu, Arenas, and others, from the Bay of Davao to Cape San Agustin.

EASTERN COAST.

Sailing past Cape San Agustin and along the coast toward the north one meets the following points: Baluc, Camamauan, Luban, Salasada, Nagas, Masala, Macaoran, Alo, Tumadgo, Tataidaga, Camainsi, Batiano, Taganilao, Lamigan, Uguis, Gorda, Flaca, Tugubum, Maglubun, Buan, Bunga, Pusan, Sancol, Baculin, Lamigon, Daguet, Lambajon, Quinablayan, Bagoso, Tonquil, Catel, Catarman, Sanco, Tagtada, Maslic, Lamon, Baculin, Umanun, Lambillon, Tandag, and Cauit, from the latter of which the eastern coast of the Peninsula of Surigao starts.

ADJACENT ISLANDS.

BAY.

BASILIN.

The bay of Maluse, situated on the western part of the Isabela de Basilan, is a remarkable one. It is the most important bay of the whole group of Basilan.

PORTS AND ANCHORING GROUNDS.

CAMIGUIN AND BASILAN.

The harbor of Catarman, in the island of Camiguin, and that of Malamaui, in the island of Basilan, are good anchorages.

POINTS.

The principal points of Dinagat are: Desolacion and Berrugosa on the north. Peninsula and Penascales on the east, and Gabo on the south.

CAMIGUIN.

Points Agojo, Maquinog, Cubuang, and Farol are the best known on the island of Camiguin.

BASILAN.

The same may be said of Points Calabaza, Matangal, and Mangal as regards the island of Basilan.

CHAPTER IV.

ARCHIPELAGO OF JOLO AND ISLANDS OF LA PARAGUA AND BALABAC.

ARCHIPELAGO OF JOLO.

BAYS AND COVES.

GROUP OF BALANGUINGUI.

There are not in this group any coves or bays worthy of special mention, on account of its being composed of small islands and various islets. Navigation between the islands of this group is rather dangerous, on account of the strong currents which are to be found in its little-known channels.

GROUP OF JOLO.

In this group the most important bays are Jolo, Maibun, Tutu, and Pitogo.

Jolo.—The bay or harbor of Jolo is comprised between points Daingapit and Belan on the southern extremity. Its coasts are clear, and its bottom, slightly shelving, is generally of thick sand.

Between points Belam and Candea there are formed two small coves, which are separated by Point Bulangsi.

Maibun.—The cove of Maibun is comprised between points Cabalian on the west and Putic on the east, distant from each other 8 miles. It runs in about 2 miles northward on the coast of the island of Jolo.

Tubu.—The bay of Tubu opens east of that of Maibun and close to it, between points Putic and Carangdato, distant from each other 13 miles.

Pitogo.—The clear and rock-bound bay of Pitogo extends 11 miles to the northeast from point Carangdato, and is comprised between this point and Point Landican.

GROUP OF TAPUL.

Although there are no important bays in the group of Tapul, there are various bends which may serve as anchorages, especially in the islands of Siasi, Tapul, Lapag, and Lugus.

GROUP OF TAWI-TAWI.

Among the bays of the group of Tawi-Tawi, only those of Basbas, Tawi-Tawi, and Chongos are worthy of notice.

Basbas.—The bend or small bay of Basbas is situated on the island of this name.

Tawi-Tawi.—There are on the island of Tawi-Tawi, the largest one of the group, four bays or bends, sheltered and distributed at almost equal distances around the coast.

Aguada.—The cove of Aguada is situated south of the island of Bongao.

Chongos.—The cove of Chongos is situated northeast of the same island of Bongao.

PORTS AND ANCHORING GROUNDS.

GROUP OF BALANGUINGUI.

There are some unimportant harbors in this group, especially in the island of Balanguingui, which is a center of piracy.

GROUP OF JOLO.

Tulayan.—The harbor of Tulayan is the best of the whole group, although its depth of sounding water is irregular. It is situated northeast of Jolo. South of Tulayan there is a deep cove.

Jolo.—The anchorage of Jolo is in the bay or harbor of this name.

Pata.—There is a fair harbor in the island of this name.

There are also fair anchoring grounds in the bays of Maibun, Tubu, and Pitogo.

GROUP OF TAWI-TAWI.

Tapaam.—There is good anchorage at the pass of Tapaam, between the island of this name and that of Lapag.

Basbas.—North of the channel of Basbas there is a very well-sheltered harbor and anchoring grounds for all kinds of craft, and it is easily accessible.

Dos Amigas.—The port of Dos Amigas is situated on the northern coast of Tawi-Tawi, 9½ miles west of the harbor of Basbas.

Ubian.—Vessels can anchor in the channel which runs east of the island of Ubian. There are good anchorages of 13 to 20 meters, over sand, opposite to the northern extremity of Ubian, and of 15 to 18 meters in the placer which extends east of Pandana.

POINTS.

The islands of the archipelago of Jolo being mostly small, this archipelago is unimportant from a hydrographic point of view so far as the survey of its points is concerned. We shall, however, mention a few of the principal ones.

The best known are on the island of Jolo, and they are the following: Tuctuc, Igasan, Daingapit, Belan, Candea, Silangan, Cabalian, Putic, Carangdato, and Ludican.

Point Balimbin, on the island of Tawi-Tawi, is also known.

ISLAND OF PARAGUA.

BAYS AND COVES.

There are various bays and coves of importance on this island. We will confine ourselves to mentioning a few of the most important ones.

WESTERN COAST.

Going along the western coast, starting from the south, one finds the following bays and coves:

Canipan.—The bay of Canipan, formed by Points Alimudin on the south and Cape Siacle on the north, derives its name from a river which flows into it.

Limapug.—The bay of Limapug runs north from Cape Siacle and ends at Point Coreti on the north.

Sepangow.—The bay of Sepangow opens 5½ miles northeast of Cape Siacle.

Marasi.—The bay of Marasi extends from Point Roca to opposite the island of Litalita.

Eran.—The bay of Eran or Cran opens north of the point of this name and contiguous to it.

Nacoda.—The cove of Nacoda is formed by the island of this name and the coast of Paragua.

Tagbayug.—The bay of Tagbayug extends east of Cape Albion.

Traidora.—The Traidora Bay opens 12 miles from Cape Albion.

Apuranan.—The harbor or bay of Apuranan is 5 miles distant from the cliff of Moorsom, south of Point Larga.

Ulugan.—The aborigines call the bay of Banog "bay of Ulugan." It runs inward 8 miles to the south, and almost divides the Paragua in two halves. Its entrance is 2 miles wide, between Point Corneria and Point Cabeza Rota.

Taguipa.—The cove of Taguipa opens next to Cape Dean.

Ostras.—The cove of Ostras is situated between Points Coral and Mareografo.

San Pablo.—The bay of San Pablo extends east of Point Sangbonen.

Botalon—The bay of Botalon is formed on the northern coast of Point Promontorio.

Cruz de Mayo.—The bay of Cruz de Mayo is east of the islands of Catalat and Cacbolo and contiguous to them.

Reinas.—The bay of Reinas runs inward between Point Bubon and Point Ostras.

Pagdanan.—The bay of Pagdanan is comprised between Point Betbet and Cape Pagdanan.

Imuruan.—The bay of Imuruan is formed by Cape Pagdanan toward the south and Point Emergencia toward the north.

Inlututoc.—The bay of Inlututoc is formed by Cape Capoas and Point Del Diente.

Bolalo.—The bay of Bolalo, north of Point Del Diente, is comprised between this point and Point Barmidiaran.

Malampaya.—The bay of Malampaya, situated on the opposite coast of Taytay, is perhaps the best in the Philippines.

Pirata.—Pirata Bay is the best of the three bays which are formed at the entrance of the port of Malampaya and the narrows which are 4 miles to the north.

Caiman.—The bay of Caiman is the northern one of the two which occupy the southern side of the strait, contiguous to Pirata Bay.

Malipu.—The bay of Malipu is separated from the bay of Caiman by Point Balulu.

Bacuit.—The bay of Bacuit is a deep bay, formed by a series of islands and by the coast of La Paragua, near its northern extremity.

EASTERN COAST.

Going along the eastern coast, from south to north, one meets the following bays and coves:

Piedras.—The bay of Piedras runs inward and near the Mantalingajan mountain range.

Islas.—The bay of Islas is on the same parallel as that of Tagbayug on the western coast.

Aldea.—The bay of Aldea opens 2 miles north of the island of Malanoa.

Honda.—Seamen call Bahia Honda (Honda Bay) that part of the coast which extends about 25 miles to the southwest of Point Acantilada. It corresponds to the bay of Ulugan on the western coast.

Islas Verdes.—The bay of Islas Verdes is formed northeast of the Verde Islands.

Dumaran.—The bay of Dumaran opens toward the north of Point Barton.

Taytay.—The magnificent bay of Taytay, 10 miles wide and 6 miles deep, extends on the opposite coast corresponding to the interior of the port of Malampaya.

Silanga.—The bay of Silanga is formed by the island of Maitiaguit and the coast of La Paragua.

Aletas de Tiburon.—The bay of Aletas de Tiburon runs inward north of Maitiaguit and contiguous to this island.

Santa Monica.—We call bay of Santa Monica that small cove which opens near to the northern extremity of La Paragua, and on which is situated the town of this name.

Darocotan.—The cove of Darocotan opens north of the point of this name.

PORTS AND ANCHORING GROUNDS.

WESTERN COAST.

Eran.—There is good anchorage east of Point Eran, in the bay of this name.

Nacoda.—The anchoring grounds of Nacoda are in the cove of this name.

Tagbayug.—The anchoring grounds of Tagbayug are in the bay of this name.

Apuranan.—The anchoring grounds of Apuranan are west of the cliff of Apuranan.

Ulugan.—The anchoring grounds of Ulugan are at the southern extremity of the island of Santa Rita.

Barton.—The port of Barton comprises the space of sea between the islands of Albaguen and Cacnipa and the promontory which advances toward the east of the latter island.

Capsalay.—There is an anchorage north of the island of this name.

Imuruan.—There is also an anchorage in the bay of this name.

Malampaya.—The magnificent port of Malampaya is on the eastern part of the peninsula of Capoas. It is without a doubt the best in the island.

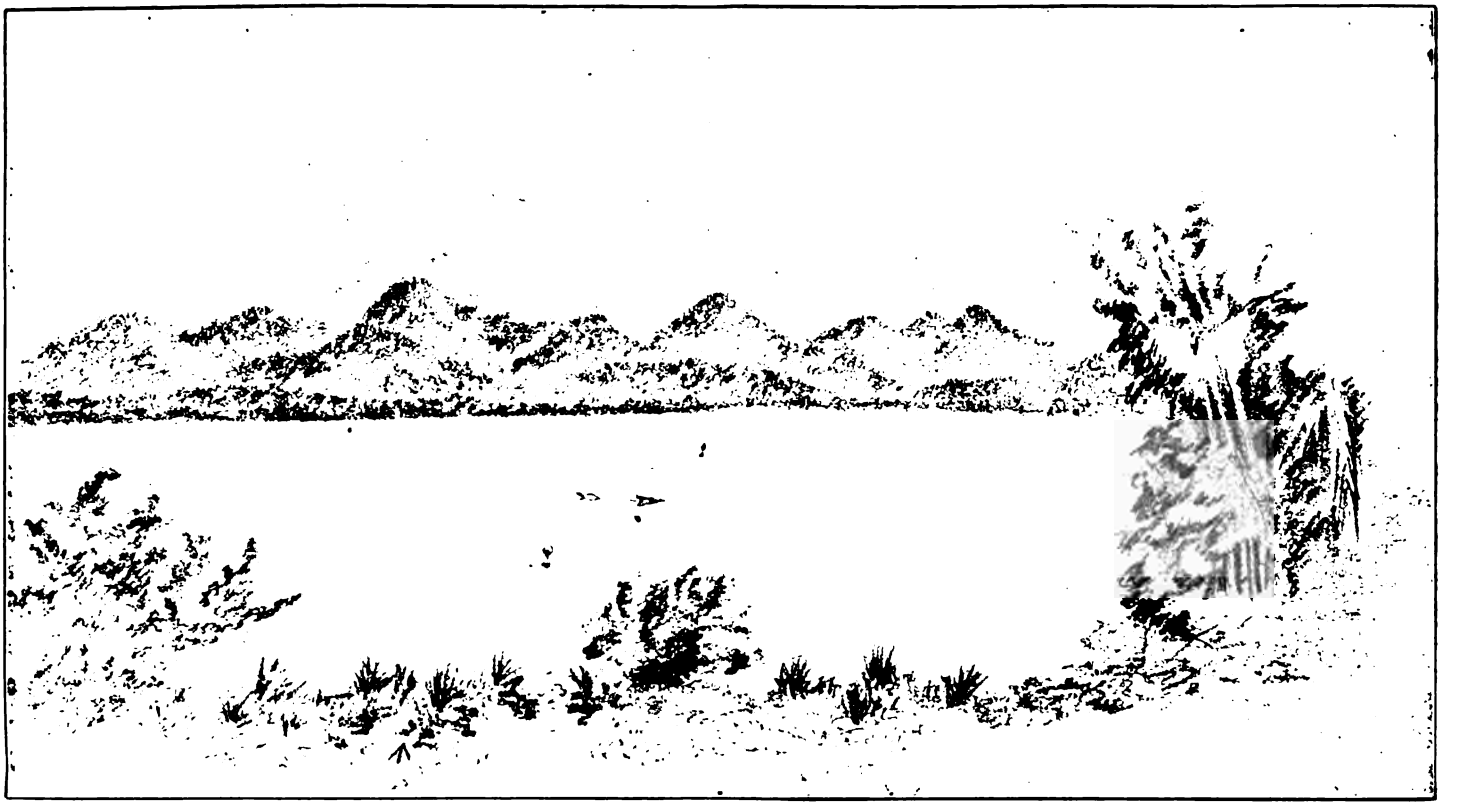
Cadlao.—We call the harbor of Cadlao the one which is situated on the northern side of the island of this name.

EASTERN COAST.

Port Princesa or Port Yuahit.—This port is 4½ miles northeast of Point Tabla and its entrance is between this point and Point Saboruce.

Cana.—We call the harbor of Cana the one which is situated between the ridge of Point Cana and Point Bateria.

Dumaran.—The island of Dumaran has good anchoring grounds toward the south-southwest of the bay of this name.



PORT OF PRINCESA.
From the woods of the naval station.

CAPES AND POINTS.

The principal capes and points of the western coast of Paragua are: Cape Buliluyan, on the southern extremity. Points Reposo, Panimusan, Alimudin, Providencia, Pinos, and Lean; Cape Washington; points Jervois, Townsend, Pampandugang, Eran or Cran; capes Albion and Tajado or Point Steep; points Larga, Mesa, Del Noroeste, Piedras, Promontorio, Pagdanan, Macaguit, Tabonan, Del Diente, Parmidiaran, Del Esfuerzo, De la Columna; Cape of La Cuna; points Baluluk, Cabuli, and Darocotan, on the northern extremity of the island.

EASTERN COAST.

The principal points on this coast are: Rawnsley, Madropora, Decepcion, Marantow, Okyan, De la Iglesia, Segyam, San Juan, Sir James Brook, Filantropia, De la Nariz, Del Pescado, Eustasia, Scolt, Separacion, Casuarina, Tabla, Binunsalian, Briyoon, Del Castillo, Acantilada, Flechas, Bay, Tinactactan, and Negra.

ISLAND OF BALÁBAC.

BAYS AND COVES.

The principal bays and coves of the island of Balabac are those of Calandorang, Dalauan, Clarendon, and Puerto Ciego.

Calandorang.—The bay of Calandorang extends toward the northern part of the island.

Dalauan.—The bay of Dalauan is on the eastern coast near the southern end of the island.

Clarendon.—The bay of Clarendon opens toward the northeast of Dalauan.

Puerto Ciego.—The bay known by the name of Puerto Ciego opens toward the northwest, and is obstructed by coral reefs.

ANCHORING GROUNDS.

Although anchor may be dropped all along the channel or northern strait of Balabac, there is a bend west of a rather long ledge of rocks which is formed in front of the mouth of a wide creek and which is more or less half a cable's length distant from the eastern entrance of the channel on the southern coast, where there is an anchorage of 10 meters in depth with a mud bottom.

Port of Principe Alfonso.—There is a good anchorage in the bay of Calandorang, sheltered and protected, especially against the winds and seas from south to west, called Port of Principe Alfonso.

CAPES.

Capes Desastre and Melville, the former on the northern extremity of the island and the latter on the southern end, are worth mentioning specially.

CHAPTER V.

SEAS, CHANNELS, STRAITS, PASSAGES, AND "SILANGAS."

REMARKS.

As it was not easy to include in the division which we have followed in this treatise the seas, channels, straits, passages, and silangas of the Philippine Archipelago on account of their large number, and it being on the other hand very useful to know where they are situated, we have thought it proper to devote this chapter to the enumeration and location of same.

Although there is apparently no essential difference between a channel, a strait, a passage, and a "silanga," we shall still adopt the names given by seamen acquainted with these islands, or which have been used in the hydrographic maps hitherto published.

SEAS.

The seas which wash the Philippine Archipelago are the Pacific Ocean on the east, the China Sea on the north and west, the Celebed Sea on the south, and the Sea of Jolo or Mindoro, comprised between the islands of Borneo, Paragua, Calamianes, Mindoro, Panay, Negros, Mindanao, and the archipelago of Jolo.

The portion of sea which extends from the southern part of Luzon to the northern coast of Mindanao, between the Visaya Islands, is known by the names of Interior Sea, Interinsular Sea, and Visayas Sea.

CHANNELS.

The most important channels in the Philippines are the following:

Channel of Baschi, between the island of Formosa and the group of Batanes, north of Luzon.

Channel of Balingtan, between the Babuyanes Islands and the Batanes, north of Luzon.

Channel of Isla Verde, between Luzon and the island of Mindoro.

Channel of Lubang, between the group of the Lubang Islands and Mindoro.

Channel of Mindoro, between Mindoro and the Calamianes group.

Channel of Ylin, between the Ylin and Mindoro islands.

Channel of Ambolon, between the Ylin and Ambolon islands.

Channel of Biliran, between the northwestern point of Leyte and the southwestern coast of Biliran.

Channel of Buad, between the bay of Maqueda and the Parasan and Buad islands.

Channel of Janabatas, on the west-northwest end of the strait of San Juanico.

Channel of Malapascua, between the Malapascua and Chocolate islands.

Channel of Tictauan, at the eastern entrance to the strait of Basilan.

Channel of Binitosa, in the Basilan group.

Channel of Salipin, in the Basilan group, to the south.

Channel of Tapiantana, in the Basilan group, to the south.

Channel of Siasi, in the Tapul group.
Channel of Basbas, in the Tawi-tawi group.
Channel del Norte, northeast of the island of Balabac.
Channel of Comiran, east of the island of Balabac.
Channel of Lumbacan, east of the island of Balabac.
Channel of Simanahan, east-southeast of the island of Balabac.
Channel of Enmedio, southeast of the island of Balabac.
Channel of Mangsee, southwest of the above.
Channel of Noche Buena, in the Tawi-tawi group.
Channel of La Verbena, in the Tawi-tawi group.
Channel of Maipat, in the Tawi-tawi group.
Channel of Cambacamba, in the Tawi-tawi group.
Channel of Sipungut, in the Tawi-tawi group.
Channel of Tandubas, in the Tawi-tawi group.
Channel of the west of Banaran, in the Tawi-tawi group.
Channel of the west of Basibuki, in the Tawi-tawi group.
Channel of Balseiro, in the Tawi-tawi group.
Channel of Bambulin, in the Tawi-tawi group.
Channel of Pasco, in the Verde Islands.
Channel of Dumaran, between the islands of Dumaran and Paragua.

STRAITS.

The principal straits are:

Strait of San Bernardino, between the Southern end of Luzon and the northwestern end of the island of Samar.

Strait of the Isla Verde, between Luzon and the Island of Mindora. (Also called Channel of the Isla Verde.)

Strait of Los Ticlines, between Luzon and the islands of Calintan, Juac, and Ticlin, southeast of the province of Sorsogon.

Strait of Mindoro, between Mindoro and the Calamianes Island. (Also called Channel of Mindoro.)

Strait of San Juanico, between the islands of Samar and Leyte.

Strait of Coron, in the Calamianes group.

Strait of Iloilo, between the islands of Panay and Negros.

Strait of Tanon, between the islands of Negros and Cebu.

Strait of Surigao, between the southern ends of Samar and Leyte and the northern coast of Mindanao.

Strait of Basilan, between the islands of Mindanao and Basilan.

Strait of the Bloqueo, toward the south of Tuluran (Paragua).

Strait of El Esfuerzo, toward the east of Tuluran (Paragua).

Strait of Balabac, between the islands of Balabac and Banguey.

Strait of the north of Balabac, between the islands of La Paragua and Balabac.

PASSAGES.

The passages between the various islands are, as it will be easily understood, innumerable. We shall only mention some of those specially known as being the most frequented by vessels:

Passages of Boca Chica and Boca Grande, at the entrance of the bay of Manila.

Passages of Ambil, in the group of the Lubang Islands.

Passages north of the Verde Island, between the Verde Island and Batangas.

Passages south of the Verde Island, between the Verde and Mindoro.

Passage north of Maricaban, between the island of Maricaban and Batangas.

Passage south of Maricaban, between the islands of Maricaban and Mindoro.

Passage of Mompog, between Point Tuginan (Luzon) and the island of Mompog.

Passage of Sibuyan, between the islands of Sibuyan and Masbate.

Passage of Masbate, between this island and that of Ticao.

Passage of Ticao, between this island and that of Luzon.

Passage of Tablas, between this island and that of Romblon.

Passage of Bocaboc, at the entrance of the Strait of Tanon.

Passage east of Ginatuan, between the northeastern coast of Mindanao and the islands of Dinagat and Bucas.

Passage of Tapaam, in the Tawi-tawi group.

Passage of Pangutaran, in the Tawi-tawi group.

"SILANGAS."

The most frequented "silangas" are the following:

"Silanga" of Golo, in the Lubang group.

"Silanga" of Cabra, in the Lubang group.

"Silanga" of Rapurrapu, between the islands of Rapurrapu and Batan.

"Silanga" of Sula, between Luzon and the island of Cacraray.

"Silanga" of Pitogo, between Luzon and the island of Pitogo.

"Silanga" of Casolgan, between the islands of Cacraray and San Miguel.

"Silanga" of Cacraray, between the islands of Cacraray and Batan.

"Silanga" of Cebu, between the islands of Cebu and Mactan.

"Silanga" of Tagbilaran, between the islands of Bohol and Panglao.

"Silanga" of Gabo, between Dinagat and the islands of the Ginatuan group.

"Silanga" of Dapa, between the southwestern coast of the island of Sirgao and the island of Bucas.

"Silanga" of La Isabela, between the islands of Malamaui and Basilan.

PART SECOND.

TERRESTRIAL HYDROGRAPHY.

CHAPTER I.

RIVERS AND LAKES.

LUZON.

FOUR PRINCIPAL RIVERS.

There are four principal rivers in the island of Luzon, which run in opposite directions nearly the whole length of the island, namely: The Grande de Cagayan, the Agno Grande, the Abra, and the Grande de la Pampanga. Their basins are determined by the three great mountain ranges, which, as we said in the Treatise on Orography, belong to the system of the Caraballos.

BASIN OF THE RIVER GRANDE DE CAGAYAN.

Among the rivers of Luzon the Grande de Cagayan, likewise called Tajo by the Spaniards, holds the first place, not only on account of its great length but also on account of the great volume of its waters. Compared with all the rivers of the archipelago it is second to none, unless it be the river Grande de Mindanao. The territory drained by it embraces all the region lying between the Western Caraballos, the Sierra Madre, and the Southern Caraballos, with a total area or extent of 38.52 square kilometers. The source of this great river is on the northern slope of the Southern Caraballos, to the east of the starting point of the Mamparan mountain range.

At first it follows a northeasterly direction, and after receiving the waters which come from the eastern slope of the above-mentioned Mamparan range and those which come from the western slope of the Sierra Madre, it continues in the same general direction for a distance of more than 20 leagues until it reaches Tumauini, which is about half-way of its course, having received by its left bank, in the neighborhood of Gamu, the largest of its affluents, the River Magat. Passing by Ilagan and Tumauini, it continues its course in a northerly direction, and having, with great windings, fertilized the towns of Cabagan, Nuevo, Iguig, Amulung, Alcala, Gattaran, and Lal-lo, it reaches, with a broad and navigable current, the town of Aparri, located near its mouth, where it yields up its tribute of waters to the China Sea, which bathes the northern coast of Luzon.

Numerous tributaries pour into the Cagayaan on both sides, those deserving special mention being the Magat, the Bangag or Chico, and the Siffu or Sibbu, which enter into it by the left bank.

MAGAT.

The Magat is approximately 25 leagues long, and rises in the southwest corner of the province of Nueva Vizcaya, among the mountains Mingolit, Salaesa, Dalandem, and Ugu or Lugsen, at the junction of the Western Caraballos and Mamparan mountain ranges. It runs first toward the north, passing by Aritao; it waters the boundaries of Bambang, Bayombong and Bagabag; then it turns toward the east, passing by Reina Mercedes, and empties its waters into the Cagayan near the town of Gamu. The affluents of the Magat, within the province of Nueva Vizcaya, are: the Mingolit, Caraballo, Abual, Matumut, Ibulao, Alinit, Mayoyao, and other less important ones on the left bank, and the Abian, Angadanan, and Salinan on the right.

BANGAG.

The Bangag or Chico empties into the Cagayan on its left bank in the township of Alcala, and near the town of Nagsiping. It gathers its waters from numerous tributaries, which descend in different directions from the rugged mountains situated on the west of the divide of Itaves, and those from the eastern slopes of the Central Caraballos, where it rises near the valley of Banano. Its length is some 17 leagues, and, although at the beginning it flows from west to east as far as near Piat, it turns thence toward the northeast until it reaches the Cagayan. While passing through the provinces of Cagayan, Albra, and Bontoc it receives its most important tributaries, which are the Saltan, Nabbuangan, and Sable.

SIFFU.

The Siffu or Sibbu gathers all the waters of the region west of the district of Bontoc and, flowing toward the east, passes through part of Isabela until it joins the Cagayan between Ilagan and Tumauini.

OTHER AFFLUENTS.

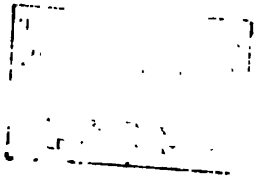
From the western slopes of the Sierra Madre, crossing districts inhabited only by savages, there descend many other tributaries of the Cagayan, which join it on its right bank; the principal ones being the Disabungan, Ditulay, Catalangan, Tarretic, Masagan, Pinacanauan de Tumauini, Pinacanauan de Cabagan, and Pinacanauan de Tuguegarao. They are all short, the longest not exceeding 10 leagues in length.

BASIN OF THE AGNO GRANDE.

The Agno is the second in importance among the rivers of Luzon. It rises on the southern slope of Mount Data, near the boundary between the districts of Benguet and Lepanto and the province of Nueva Vizcaya. Its length is about 32 leagues. It crosses the district of Benguet from north to south and the province of Pagasinan in a direction from northwest to southeast at first, and between San Nicolas and Tayug it begins to form a great sweep, which continues in the direction from northeast to southwest, passing through Rosales, Alcala, and Bayambang, and after having received the waters of the river Tárlac a little further south, inclines toward the northwest, watering the bound-

PLATE VII.

RIVER PINACANAUAN.



aries of Urbiztondo and Aguilar, and dividing into two branches near Salasa, one flowing toward the northeast and ending in Dagupan, while the other flows toward the west, and after having received near San Isidro the waters of a branch of the first, which passes by the town of Lingayen, it pours its waters into the western part of the Gulf of Lingayen.

TRIBUTARIES.

There are many tributaries to the Agno Grande, on account of the broken country it runs through, but those which carry the most water are the ones received in the second half of its course, and the principal ones among them are the Tarlac and the Camilung, which empty into it on the left in the vast plains of Pangasinan. The other tributaries on the left are the Angbayabang, Matablan, Nibobon, Agra, Olo, Julaguit, Soboc, Salamague, and Dumulo. Of those on the right bank, which are not so numerous, the only ones that deserve mention are the Agno Chico, the Catablas, the Macalang, and the Sinuncalan.

BASIN OF THE ABRA.

The third of the rivers of Luzon is the Abra, which, descending from the northern slope of the Data, in the district of Lepanto, in the opposite direction to the river Agno Grande, gathers in the beginning the waters of the northern and western slopes of the Data, and those of its tribuary, the Sayuc, which, having its source on the southern declivity of the same mountain, forms a great curve toward the south, then runs toward the north, and empties into the Abra between the towns of Mancayan and Cervantes, the volume of water being then considerable. Its general direction from Cervantes to Angaqui, near the mountain range of Tila, and in the eastern part, is from south to north as far as Tayum, in the province of Abra; there it describes a semicircle in a southerly direction and soon continues in a southwesterly course, passes through the mountain range which separates Abra from Ilocos Sur, and, having watered the boundaries of Bangued, Pidigan, and San Quintin, divides, within Ilocos Sur, near Santa, into two branches, which not far from Vigan empty at different points into the China Sea. Its length is some 25 leagues.

TRIBUTARIES.

Besides the Suyuc it receives as tributary the Tinog, which is formed by the union of the Anayan and Caluan, which gather the waters from the southern slopes of Pagsan. It flows from northeast to southwest, to increase its volume, near La Paz, with the waters of several rivers which rise in the mountains Liputen, Mabulusan, Cusa, Balatinao, and Maonayud, until between Dolores and San Gregorio it joins the main branch of the Abra. Other less important tributaries are the Malanao, Baay, Abas, Mamebel, Bulloc, Damunil, Ulip, Balasian, and Dicapen, all on the right bank, which gather the waters from the western slope of the central Caraballos.

BASIN OF THE RIO GRANDE DE LA PAMPANGA.

The river Grande de la Pampanga has its source in several rivers which drain the waters from the southern slopes of the Southern Caraballos range, in mountains Lagsig and Mingolit, and therefore on the

opposite slope to that of the river Magat, which, as we have just seen, belongs to the basin of the river Grande de Cagayan. Its general direction is from north to south, and it flows through the provinces of Nueva Ecija and Pampanga. In the first part of its course and before receiving, near Arayat, the river Chico de la Pampanga, it waters the boundaries of Bongabon, Santos, Cabanatuan, Jaen, San Isidro, and Cabiao, all in Nueva Ecija. From Arayat it turns toward the east, and, passing near the shores of Lake Candaba, it continues through San Luis, San Simon, and Calumpit, always toward the south, until, having divided into numerous branches, it forms a complicated network of channels and marshes, which empty their waters into Manila Bay.

RIVER CHICO DE LA PAMPANGA.

The river Chico de la Pampanga rises in Lake Canaron, province of Tarlac, and, taking a southeast course between the boundaries of Nueva Ecija, Tarlac, and Pampanga, after having fertilized the boundaries of La Paz and Zaragoza, near Arayat, province of Pampanga, contributes its waters to the voluminous river which from said confluence to its mouth is properly called the river Grande de la Pampanga.

OTHER TRIBUTARIES.

The principal tributaries of this great river are the Barat, Calungan, Carranglan, Tuntumin, Santor, Gapan, San Jose, and Parudo.

RIVERS CAUIT, PASIG, BICOL, AND IMUS.

CAUIT.

The Cauit traverses the province of Ilocos Norte, and, passing between Laoag and San Nicolas, over the bar of its name, pours its waters into the China Sea. Its tributaries are, among others, the Gant, the Guisi, the Baybay, the Pagsan, and the Pagsambaran, which descend from the western slopes of the northern Caraballos.

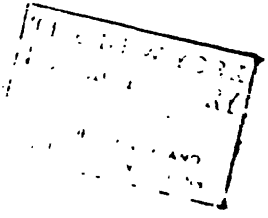
PASIG.

The Pasig, which flows out of the Laguna de Bay through five branches and is its outlet, empties into the magnificent bay of Manila. It has several tributaries, those which it receives from the right bank being the only important ones, among which may be mentioned, on account of their great volume of water, the Cainta, Grande de San Mateo, and San Francisco del Monte. Those which unite with it on the left bank are nothing more than small streams and creeks, short in length and carrying little water. The river Pasig is the principal means of communication between Manila and the interior of Luzon, especially between Manila and the Laguna de Bay, which is only 18 miles distant. Its width is from 100 to 2,000 meters, and its depth is also variable, ranging from 2.23 to 6.13 meters.

BICOL.

The Bicol is the principal river of Southern Luzon. It rises on the slopes of Mount Isarog, province of Ambos Camarines, and flows toward the southwest, dividing into two branches, the smaller one taking

GRAND RIVER OF PAMPANGA.



RIVER PASIG (NEAR CULI-CULI).

RIO PASIG (NEAR LA LAGUNA).

a southeastern course until it empties into the lake of Bato, while the main branch follows a southwestern direction, and, passing through Nueva Caceres, San Nicolas, and Panon, empties, after a course of 178 kilometers, through its mouth at Cabusan, into the bay of San Miguel. Its tributaries on the left bank rise in the Colasi Mountains and in Mount Amtig. This river forms, with the Quinali and the Lipocot, the basis of the hydrography of the province, and is of no small importance to the geology of Ambos Camarines.

IMUS.

The Imus also deserves special mention because it empties into Manila Bay, and it is navigable up to the town which gave it its name.

MINOR RIVERS.

The rivers of the coast are of little importance. Those which rise on the eastern slopes of the Sierra Madre pour their waters into the Pacific Ocean. They are the Degollirin, in Isabela; the Casignan, which empties into the bay of Baler, district of Principe; the Baler, which has several tributaries (the principal ones being the Dicaniti, the Dimanalepe, the Malanis, the Dimunaglan, and the Caliselan), empties into the bay of the same name; the Ibonan runs into the cove of Dingala; the Taborgon, into the cove of Sogod; the Cabibijan and the Calabanga, into the bay of Nagay; the Simol and the Timuragat, into the bay of San Miguel; the Malaquing and the Ilog, which descend from Mount Malarayat, into the bay of Tayabas; the Batangas, formed by the Tabla, and others which empty into the bay of Batangas.

LAKES OF BAY AND BOMBON.

BAY.

The lake of Bay, situated between the provinces of Manila, Morong, Cavite, and Laguna, is undoubtedly the most important in the island of Luzon. It is some 200 kilometers in circumference, with an island in the center called Talim, which forms the strait of Quinabulusan, besides several other small islands, such as those called Pulo Insan, Pulo Olgipan, Pulo Calamba, and Pulo Bay. On the north there are three gulfs and two peninsulas, and on its shores are found the capitals Morong and Santa Cruz de la Laguna. It communicates with Manila Bay through the Pasig River, and it receives the waters of 15 rivers. It has all the appearance of a small sea of fresh water, and among the fish caught in it those called "corvinas" (a kind of conger) are celebrated.

BOMBON OR TAAL.

The lake of Taal or Bombon, situated in the northeastern part of the province of Batangas, is second in importance among the lakes of Luzon. It has a perimeter of 120 kilometers, approximately, its diameters from north to south and from east to west being, respectively, 28 and 20 kilometers. It communicates with the sea through the river Pansipit, which has a very slight inclination, and this clearly proves that there is very little difference between the level of the lake and the sea level. In spite of its small size the depth of this lake is quite considerable, measuring as much as 106 fathoms at a very short

distance from the shore in some places, as has been proved by various soundings taken in it. In the midst of it is the volcano of Taal, which we mentioned in the Treatise on Orography, Chapter III, page 439.

OTHER NOTEWORTHY LAKES.

Besides those of Bay and Bombon, there are also worthy of mention, in the territory of Luzon, those of Candaba and Canaren, in the province of Pampanga; that of Hagonoy, in Bulacan; that of Mangabol, between the towns of Paniqui and Bayambang, in the province of Tarlac, more than 25 kilometers in circumference; that of Cagayan, in the northeastern region of the province of that name, with a length of 16 kilometers by 11 in width; that of Talavera, in Nueva Ecija, with a perimeter of 22 kilometers; that of Paoay or Danum, 10 meters deep and more than 10 kilometers in extent, in the province of Ilocos Norte; the lake Bato, among whose tributaries are found the rivers Bicol, Naga, Libon, and others, which irrigate its surroundings, a deep lake, very rich in fish; that of Buhi, large and beautiful, whence start several rivers, among them the important one which takes its name, and that of Baao, no less extensive, all of them belonging to the province of Ambos Camarines.

ISLANDS ADJACENT TO LUZON.

MINDORO.

RIVERS.

According to the Official Guide of the Philippines more than sixty rivers in the island of Mindoro are known, and there must be many more in the interior that have not yet been explored. Among the former the principal ones are the Malaylay, between Bacoo and Subaang; the Nabuluan, Magasauangtubig, Navotas, Naujan, Pola, Macaulit, Bansod, Masaguisi, and Bongabon, between Pola and Ticlin; the Basig, Bumbusan, and Manjao, between Ticlin and Bulalacao; the Lambangan, in Mangarin; the Pagbajan, which empties into the bay of Paluan, and the Tabinay, in Puerto Galera.

The Santo Tomas, Maasim Arnay, Santa Cruz, and Mamburao should also be cited.

LAKE OF NAUJAN.

This lake is located in the northeast part of the island. It is some 25 kilometers in circumference, and the river Naujan flows from it and, passing the town of the same name on the south, runs directly into the sea.

MASBATE.

Of all the rivers of this island only the Lauang, the Asid, and the Guinotaban are worthy of special mention. The first descends from the mountains of Bagasimbahan and runs from south to north to its mouth in the port of Barrera. The second comes down from the opposite side of the same mountains, takes a contrary course, and ends in the bay of the same name. The third is important only on account of the auriferous sands which it brings down with it.

CATANDUANES.

Among its small rivers the principal ones are the Himoto and Sinago, which empty on the east coast, and the Batoo, which empties on the south coast, near the town of the same name, and is, perhaps, the longest and the one which has the most water of all.

POLILLO.

The rivers Upala and Bonleo and several other less important ones descend from the central mountains of the island.

BISAYAS ISLANDS.

PANAY.

Three great rivers, which may well be called of the first order, constitute the drainage system of Panay. They are the Panay, Jalaur, and Aclan. There are other less important ones, among which the most prominent are the Salug, the Ibajay, and the Sibalon.

PANAY.

The Panay, which is the principal one, rises in the northern slopes of Mount Baloy, which, as we have seen in the Treatise on Orography, constitutes the dividing line between the provinces of Capiz, Antique, and Iloilo. From its source the Panay takes the direction from east to west as far as Capas, whence, with numerous and marked windings, it turns toward the southeast, irrigates the boundary of Dumalag, and before reaching the boundary of Cuartero its volume is augmented with the waters of the Babbarad, with numerous tributaries, and turning toward the south it passes through Dao, and receives two large tributaries, the Mambusao and the Mayon, which so increase its volume that from Panitan to its mouth it attains an approximate width of 100 meters. After the Mayon joins it it turns toward the north, waters the territories of Panitan and Loctugan, and divides near Agbangbang into two branches, the main one of which, flowing toward the east, passes through the town of Panay, and empties into the sea by three main mouths, called Jumulao, Paua, and Guibuangan-Daco, while the other takes a course from south to north until it again divides into two forks in the ward of Sansasud, one of the two branches taking the name of the river Banicaa, and being lost in the marshes of the mouth Guibuangan-Daco, and the other continuing as far as Capiz, capital of the provincial district, whence it takes the general course of west-northwest, and empties into the gulf which is formed south of Point Nipa.

JALAUR.

The Jalaur also rises in Mount Baloy, receives innumerable although small tributaries on both sides, and takes its course toward the southeast. In Alibunan the river of this name joins it. It turns toward the southeast, waters the confines of Calino and Passi, where the Lamunang unites with it, a river with a considerable volume of water which it gathers from many affluents, the principal one being the Maliao. It waters the confines of San Enrique, on the south, and not very far from Duenas receives the waters of the Ulian, formed by

many affluents from the main mountain range, and continues in a southeast direction as far as Dingle, taking in this township a southerly course. In Jalaur it increases its volume of water with the Abangay and the Suague, from the same source as the Ulian, and waters the boundaries of Pototan and Barotac Nuevo on the south, and having received the waters of the Janipaan it empties at Colongcolong into the strait of Iloilo.

ACLAN.

The Aclan has the same source as the Panay, but not the same direction, which is from south to north with few windings. It receives its main tributaries on the left from the western slopes of the mountains of the main range, traverses Libacao, Madalag, and Malinao, irrigates the boundary of Calivo, and in Camansi, near the northern coast, it divides into two branches, forming the little island of Bacao. Its principal tributaries are the Dalagnan, Cabarsana, Dumalaylay, Tingbaban, Bulabot, and Malinao, on the left bank. Those on the right bank are less important, among them the Manicaa and the Pangpangon, which has several tributaries, and the Calancan.

SALUG.

The Salug, proceeding from a depression in the eastern slopes of mounts Llorente and Inaman of the main mountain range, follows a course from northwest to southeast, and waters the boundaries of Maasin, Cabatuan, Santa Barbara, and Pavia, where the Agauan unites with it, until near Iloilo, where it empties.

It is some 60 kilometers long and receives the waters of the Titong, which also rises in the eastern valleys of Mount Inaman and in the opposite ones of Tiratid, and after a course of 22 kilometers empties into the Salug by its right bank, near Maasin. The Agauan descends from Mount Tiguran in an easterly course and lower down changes its direction toward the south, and, flowing through the town of San Miguel, twists toward the east, where, after a course of some 52 kilometers, it empties into the river Salug, also by the right bank, near pavia.

IBAJAY.

The Ibajay has its source among the Toctocon and Sanasico mountains, at a considerable height, and descends toward the northwest, with many turnings, until it reaches its confluence with the Garot. It has many tributaries, among which may be named the rivers Dalanao and Garot. The Garot, which is the most notable, rises on the northern slope of Mount Panancaban, in the district of Antique.

SIBALON.

The Sibalon, which descends from the western slope of Mount Llorente, on the opposite side to the river Salug, follows a course from northeast to southwest, passes through San Remigio, and fertilizing the boundaries of Sibalon and San Pedro, near this town, pours its waters into the sea by the western coast. Its chief tributaries are the Tangday, Maninila, which is formed by the Dungaron and Maliao, the Banayan and the Tigpuluan. The latter, which has the greatest volume of water, unites with it in the town of Sibalon.

LESS IMPORTANT RIVERS.

Finally, although not so important as the preceding, there are, however, several rivers in the central region worth mentioning, regarding which Don Enrique Abella, in his Descripción Física de Panay (physical description of Panay), says the following:

"The rivers Timagboc, Uyungan, Sinaragan, Bacauan, Bayonan, Tiolas, Lanigan, and Hibog, which empty on the south, and those of Tagalan, Jalo, Habalili, and Ibisan, which empty on the north of the island, may also be mentioned as very notable. In the western region, to the north of the basin of the river Sibalon, there are three others which almost attain the same size, namely, the rivers Cangaranan, Paliuan, and Dalanas, and they are the ones which, on account of their importance, should be classed next to the Sibalon. Then to the north and south of these four most noteworthy streams in Antique, there are other rivers, which decrease in size as the distance from the former increases. Among them should be mentioned, on the north, the Cairaman, located between Dalanas and Paliuan, the Tibiao, the Bacon, the Bacalan, and the Ipayog, and on the south, the Antique, the Asluman, and the Dao. In the eastern region the most notable rivers are: Balantian, Bangun, and Pamian or Estancia, which flow through the plain of Balasan and Quiasan, and which empty into the sea through great salt lakes of great depth up to the bars; the Bunglas and its numerous tributaries from the beautiful plain of Sara and Ajuy; the Barotac Viejo, on whose banks auriferous exploitations have been made, and the Aglacaigan, which empties into Banate."

NEGROS.

The principal rivers of this island are those which empty on the west coast, the Ginigaran, Himamaylan, and Ilog being the most prominent. The Danao, 200 meters wide and 15 deep, which flows from west to east between Calatrava and Escalante, and the Marinas, 300 meters wide and 20 deep, its great branch, called the Tanao, being noteworthy, empty on the north coast. Other minor rivers are the Bunglas, Cadiz Nuevo, Manapla, Toreno, Talabc, Mandalagan, Siluban, Macaribao, Marianas, Pontevedra, Siaton, San Enrique, and some others.

CEBU.

The rivers of this island are of little importance, because they are all short, on account of the mountain range which divides the island into two very narrow parts. The one which has the longest course is the Baliguigam, which, descending from the central mountains, flows with all the characteristics of a torrent toward the northeast, until, after crossing an extensive zone of calcareous lands, it empties into the sea through a channel 300 meters wide. The Cotcot, belonging to the same eastern slope, is almost as large, and likewise resembles a torrent. Located to the south of the preceding on the same slope is the longer river of Mananga. In conclusion, there are worthy of special mention the Danao, which descends from Mount Mangilao and runs to the north of the Cotcot; the Alpaco, Minaga, Carcar, Catmon, Bao, and some others.

SAMAR.

The majority of the tributaries of the principal rivers of this island are unknown, because its central part is so rugged and therefore its interior hydrography unfamiliar. The main rivers, which fertilize it in various directions, are the Oras, which, starting from the extreme north of the central mountain range, flows at first toward the southeast, and then to the east, pouring its waters into the bay of Uguis, on the Pacific, having traversed some 57 kilometers; the Suribao, which, rising in the same mountains, soon turns toward the east, emptying on the same coast as the preceding; the Vlut, which starts from the central range, takes its course toward the northeast, then deviates to the east, and, after a course of some 25 kilometers, ends in the Pacific; the Laguan, which has its source on the same central divide, flows constantly toward the north, passes through Catubig, and drains into the bay of the same name; the Bato, which originates from the northern slopes of mounts Salta and Sangley, and flows in a north-northeast direction, emptying on the north coast, near the bay of Laguan; the Timonini, with the same source and running parallel to the Bato. Other less important rivers are the Antiyao, Basey, Balangiga, Opong, Pagbabangunan, Calbayog, and Bagajon, which, with many others, water the fertile plains and thick forests of this island.

Besides, the island of Samar has four large lakes, viz, Somotoc, Calbiga, Ganoy, and Sampinit, among which that of Calbiga is remarkable for its extensive borders, all of rock, which make it resemble a great boiler.

LEYTE.

The chief rivers of this island empty on the eastern coast into the Pacific. Among them are Dao, or Burauen, which comes from the central mountains, flows toward the east, and empties into the sea a little below Dulag; the Binahaan, which proceeds from lake Amandiuing, passing to the north of the town Dagami; the Palo, which, formed by the Dapdap and other tributaries, empties into the bay of San Pedro y San Pablo, and the Bito, which originates in the lake of its name and ends a little above Abuyog, The Maasim, proceeding from the mountains in the southern part of the island, runs some 40 kilometers from northeast to southwest and, bathing the boundary of Maasin, ends at point Gigantigan on the south coast. The Leyte empties on the north coast. It originates in a lake located to the west of Jaro, flows from south to north, and ends near the town of its name. Other smaller rivers are the Bao, Tanauan, Malburay, Cabayungan, Caloan, Cauliling, Masayac, Bayongbong, Cabalasan, Panilahan, Bayoc, Bulac, Mantitinao, Anilao, and Mansanga.

Lake Bito is of considerable extent and depth, especially during the rainy season, when it attains a circumference of more than 30 kilometers. Lake Jaro has a circumference of 25 kilometers and communicates with the sea through the river Leyte, which empties into the port of the same name.

Among the notable lakes are Aslum, 5.57 kilometers long by 1.39 wide, with a depth of 15 fathoms; Cabalian, which measures 2.86 kilometers; Polo, 3 kilometers long from northwest to southeast, and 500 meters wide from north to south.

BOHOL.

In spite of its small extent the island of Bohol contains a number of rivers, although all are short and are dry after the rainy season is over. Those that deserve special mention are the Maasin, Muguid, Manaba, Napo, Gulayan, Cabidian, Lagumay, Soca-Vilar, Fragata, Taginting, and Inabanga.

SIBUYAN.

There are three principal rivers in Sibuyan, the Mabolog, which rises in the highest peak, located in the center of the island; the Cambulayan, which has its source on the eastern slope of the peak of Sibuyan and empties on the east coast of the island at a very short distance from Point Cambulayan; the Nailog, which has its source half way up the peak of the same name.

MINDANAO.

BASIN OF THE RIO GRANDE, OR PULANGUI.

The river Grande, or Pulangui, deserves the first place in the hydrography not only of Mindanao, but also of the whole archipelago, on account of its volume of water and its length. This large river rises on the eastern slopes of the mountains Sobrac and Quimanquil of the central-western range and on the western slopes of the central-eastern range in the northeast part of the island, in the district of Misamis, and at a height of approximately 1,500 meters above the level of the sea. It descends by successive falls over the broken landings from which said ranges resemble a stairway; it flows among enormous rocks heaped up in its bed toward the south until after a course of 80 kilometers it joins the Tigua on its left bank. Then it turns toward the west, passes near Linabao, waters the boundaries of Sevilla (Mailag), at the same time receiving the waters of the Sauaga and Malupali on its right bank, twists with a slow and broad current toward the southeast on the confines of Valencia and Lepanto (Salagapon), receives the waters of the Culaman and, a little after, those of the Marama on the same right bank; again takes its course toward the south, and with various windings another Culaman joins it on the left bank not far from the confluence of the Mulita, which is the boundary of the Monteses, Moros, and Manobos. Up to this dividing line, about half of its course, it is called Palangui, and the remainder to its mouth is called the river Grande, which is navigable in a gunboat. From said dividing line the river makes a sweep from northeast to southwest, where is found what was the military post of Catituan, and at the end of the bend it receives on the right bank the waters of the Marurugao, the one of all its tributaries which carries the most water. After its confluence with the Marurugao it again turns toward the south, with marked windings, receiving some small tributaries, and passes by the military post of Piquit until it reaches the vicinity of Lake Liguasan. Its volume being increased by the waters of this great lake, it turns suddenly toward the northwest, then almost perpendicular to its general direction, which is from south to north, waters Tinucup or Reina Regente, receives several tributaries of slight importance, and on reaching

Tumbao divides into two branches, the larger of which passes through Libungan, where the river Caimanes or Libungan joins it, turns toward Cotabato, capital of the district of this name, and with few deviations empties its waters into the sea at Illana Bay through the smooth and broad north mouth. The left branch, which is somewhat smaller, runs from Tumbao to Tabiran, passes through Tamontace, and empties into the same bay by the south mouth. Between the two mouths Mount Timaco is situated. It is celebrated for its monkeys, which approach travelers who visit its slopes.

During the course of some 470 kilometers, the last two-thirds of which is calm, there is found the cascade of Logsocan, near Valencia, and that of Salagapon, a little lower down, in the township of Lepanto. In this river and in most of its tributaries there are a great many alligators, or, more properly speaking, crocodiles.

The tributaries which pour their waters into this powerful river on both sides are very numerous, the most important on the right bank being the Sauaga, Malupali, Mulita, Marurugao, and Tigua, and on the left the Culaman and the Cabacan.

SAUAGA.

The Sauaga rises on the eastern slopes of the Quitanglag range, within the boundary of Calasungay, on the divide of the waters of the basins of the Pulangui and the Tagoloan. Leaping by great rocks in the bottom of a deep channel, from Calasungay its course is toward the southeast, with several marked bends, until it reaches Oroquieta or Balaybalay. Continuing in the same direction it irrigates the boundary of Linabo, and after joining with the Malupali contributes its waters to the Palangui near Sevilla.

MALUPALI.

The Malupali orignates in the western slopes of the Quitanglag and in the eastern slopes of the Calutangan, in the divide of the waters of the Palangui and the Cagayan. At first it follows a southeast course, and in Covadonga or Alanip, where the river of this name joins it, it changes its direction toward the east, and near Sevilla unites with the Sauaga, as has been said, and empties into the Grande River.

MARURUGAO.

The Marurugao is the most voluminous of the affluents of the Palangui. It descends from the western slopes of the Pinangayonan, follows a direction from northwest to northeast, with few deviations in its whole course, which is sometimes rapid and among rocks and at others quiet, and passing through several settlements of Moros empties its waters into the Rio Grande at Dumalasag, alongside of Mount Tiniptiban. It receives, in its course of some 70 kilometers, the Malitbog, Piratan, Lalayan, and other smaller streams.

MULITA.

The Mulita is formed from the waters that rush from the eastern slope of Mount Dagumban. It flows through a small plain, and with a course toward the east passes below Mount Colcol, whence, receiving

RIVER GRANDE OR PULANGUI.

on its left bank the river Lumagus, it traverses the southern slope of Panicsican, soon after uniting with the Palangui. Its length is some 40 kilometers. Its confluence is the division between the Monteses, Manobos, and Moros. The Monteses inhabit the northeast, the Manobos the northwest, and the Moros extend toward the south.

TIGUA.

The Tigua has its source in the central-eastern range, follows a direction from southeast to northwest, through a broken country inhabited by Manobos, and after a short course empties into the Palangui, a little lower down than the Bubunanan, a small tributary on the right of the same.

CULAMAN.

The Culaman rises in the western slopes of the central-eastern range, takes an opposite direction to the preceding from northeast to southwest, and after a short course empties into the Pulangui, a little higher up than the Mulita, on the opposite bank, in front of Mount Panicsican.

CABACAN.

The Cabacan rises on the northern slopes of Apo, receives tributaries from the north and south, such as Bacat, Balanan, Maleput, and Malebol, and with considerable volume of water empties into the Palangui, near Catituan.

BASIN OF THE AGUSAN.

The Agusan is the second river of Mindanao and the third in the whole archipelago because of its length and volume of water. Its basin is formed by the main mountain ranges of the island, almost parallel to each other, and it is fed by numerous tributaries, some of them with considerable volume of water. This river rises to the east of the bay of Davao and on the western slopes of mountains Tapao, Tagdalit, and Campalili, of the eastern mountain range. Its general direction is from south-southeast to north-northwest, a course which is parallel to the two mountain ranges between which it runs, and which ends in the bay of Butuan, near the town of this name. From its source it passes through Compostela, Moncayo, Jativa, and Patrocinio, settlements of Christianized Manobos. In the first part of its course it receives various small tributaries, the principal one among them being the Manat, which joins it at Moncayo. At Patrocinio it turns toward the west, passes through Veruela, makes a curve toward the east, and at the extreme of the bend, near Clavijo, the Ihanan empties its waters into it on the left bank, and it forms the lakes Cadagun, Dagun, and Sinanat, the Humayan uniting with it on its left bank. A little below the last lake the Gibon pours its abundant waters into it from the right bank. The Agusan, augmented by the Gibon, inclines a little toward the northwest, passes through Talacogon, San Luis, Guadalupe, and San Estanislao, where it makes many turns, and a little lower down, on the left bank, the Lubang empties into it, which river rises on the eastern slopes of the mountain of the same name, and at half a day's journey farther on it makes a sweep,

and the Ujut empties into it on the same bank as the preceding tributary, opposite Esperanza. From Esperanza to its mouth in Bay Butuan the Agusan follows a south-southeast to north-northwest course, with fewer windings than in its middle course, passes by Nieves, and, having received the waters of the Bugubas on the left bank, waters the townships of Amparo and Butuan. After a course of 403 kilometers it empties, not far from said town, into the bay of Butuan. In its course there are several widenings of the channel that resemble lakes and that prevent passage along its banks.

The tributaries of this river are very numerous, as in the case of the Palangui, and some of them have considerable volume of water. The principal ones on the right bank are Simulao and Gibon, and on the left, Ihanan, Humayan, Arganan, and Ujut.

SIMULAO.

The Simulao rises in the western slopes of the eastern mountain range, on the side opposite to Bislig. Very turbulent at the beginning, and augmented with several tributaries, such as the Miaga, Bayayan, Bunanan, after watering the villages of San Isidro, Tudela, and Trento, it reaches San Jose with a direction from southeast to northwest. At this village it divides into two branches, one of which, turning toward the west, subdivides into two branches, which after a short course join the Agusan, while the other continues its course toward the northwest, and a little below the lakes also empties into the Agusan.

GIBON.

The Gibon is the largest tributary of the Agusan, and descends from the same range as the preceding one, gathering the waters from the western slopes of Mount Diuata, on the side opposite Jinatuan. Its general direction is from northeast to southwest. It crosses Navas and Prosperidad, continues in the same course to Borbon, where it describes a very marked curve toward the southeast, and at the other end of the same it receives the waters of the Suribao, of considerable volume, which passes through Novele, and together, taking a westerly direction, they empty a little below the Simulao into the Agusan, after a course of more than 120 kilometers.

IHANAN.

The Ihanan flows with many windings from the eastern slopes of the central eastern range and receives many tributaries in a very broken country, such as the Anahanan, Tignaunan, Sampinit, and others. Its course is from southwest to northeast as far as the confluence of the Sampinit, where it turns to the east and, passing through Gracia, empties into the Agusan a little lower down.

HUMAYAN.

The Humayan has its origin in the same range as the preceding river, but more toward the north. Its direction is from west to east, with a great many large curves. It receives the waters of many tributaries on both sides, passes through Loreto and, directing itself toward the northeast, soon after empties between two lakes.

PLATE XII.

MOUTH OF THE RIVER AGUSAN.

ARGANAN.

The Arganan, although it is shorter and has less volume of water than the preceding rivers, gathers its waters from the eastern slopes of the same range as the other two. It takes a direction from west to east, waters the villages of Asuncion, Sagunto, and La Paz, where it turns to the northeast and empties into the Agusan at the same place as the Gibon, but on the opposite bank.

UJUT.

The Ujut comes from the same mountain range as the preceding, in a northeast direction. It receives the waters of the Agsabo, and at Remedios the Pusilao, which is of equal volume, joins it, after having irrigated the boundary of Milagros, and together they empty into the Agusan opposite Esperanza.

RIVERS TAGOLOAN AND CAGAYAN.

After the rivers which we have just described the Tagoloan and the Cagayan, which empty into the sea on the north coast, are worthy of special mention.

The Tagoloan has its source on the boundary of Oroquieta (Balaybalay), on the side opposite the Palangui, and follows a course directly contrary to the latter, in a south southeast to north-northwest direction. Its most important tributaries are, on the right bank, the Quinapuntan, Dumalagui, Amusic, Silo, Malibog, and Quimaya, and, on the left, the Dila, Ulugan, Culaman, and the Manguina, proceeding from Mount Quitanglag. After a course of some 90 kilometers it empties into the bay of Macajalar at the town of its name.

The Cagayan rises on the opposite slopes of Mount Quitanglag and Mount Calutangan, both belonging to the central western range. It follows a direction parallel to the Tagoloan and, with a course similar to that of the latter, pours it waters, which carry with them auriferous sands, into the same bay as the Tagoloan. Its chief tributaries are the Cocina and the Tigalan.

LESS IMPORTANT RIVERS.

Among the remaining rivers of Mindanao there are still to be mentioned, on account of their relative importance, the following: Gapay, Agus, Sintogo, Dapitan, Dipolog, Lubungan, Davao, Tagum, Hijo, and some others on the Pacific coast.

The Gapay rises near Lake Lanao and takes the same direction as the Cagayan. It has several tributaries, such as the Mamanga, Samagon, and Dulama, and empties into the bay of Macajalar at Point Sulauan. Its length is 70 kilometers. The Agus comes from Lake Lanao, runs from southeast to northwest, and empties into the bay of Iligan. Its course is much shorter than that of the preceding river, and its tributaries are of slight importance. The Sintogo rises on the southern and eastern slopes of Mount Malindang, follows a course from west to east, and, after receiving the waters of the Salag, its principal tributary, empties into the bay of Panguil. The Dapitan, Dipolog, and Lubungan have their source on the northern and western slopes of

the above-mentioned Mount Malindang, and, with a course toward the northwest, empty into the sea near the towns of the same names. The Davao empties into the bay of the same name. Its small tributaries rise on the eastern slopes of Apo. The Tagum is more important, and has as tributaries the Libaganon and the Salug, whose affluents connect with those of the Agusan, which flow in an opposite direction. The short river Hijo ends, as do the other two, in the same bay of Davao. On the Pacific coast there are worthy of special mention, on account of their extent, the Casauman, Manay, and Caraga, which, rising in the mountains of Tagdalit, Campalili, and Tapao, respectively, pour their waters into the Pacific near the towns of the same names. Near Tago, on the northern coast, the river of the same name empties. It has a wide mouth and no mean volume of water.

LAKES.

The principal lakes of Mindanao are the following: Lanao or Malanao, Buluan, Liguasan, Mainit or Sapongan, Linao, and Panguil.

LANAO.

The lake of Lanao or Malanao, located in the territory of the same name, is inclosed by high mountains, which do not, however, prevent there being some plains between them and the lake. It is divided into three principal regions, namely, that of Bagabao, which includes the northeastern and part of the western shore; that of Masco, which embraces all the southern part, and that of Unoyon, which extends to the southwest. Its only outlet is the river Agus, and in exchange it receives on the southeast the waters of the Digosan. Its shores are inhabited by hordes of Moros (Mohammedans).

LIGUASAN AND BULUAN.

Liguasan and Buluan are two lakes situated between the Volcano Apo and the boundary of Catabato, which join and form but one lake during the rainy season, and notably increase with their waters the volume of the river Grande.

MAINIT.

Mainit or Sapongan, in the district of Surigao, measures 8 miles from north to south and 6 from east to west. It empties through the river Tubay, with a rapid descent, into the bay of Butuan. It is very deep and it is supposed to be the crater of an extinct volcano.

LINAO.

The lake of Linao forms part of the river Agusan. It increases extraordinarily in circumference as soon as the rainy season sets in.

PANGUIL.

Finally, the lake of Panguil, in the territory of Misamis, has a length from north to south of 7½ miles and from east to west of 6¼ miles and empties into the bay of Misamis.

CHAPTER II.

MINERO-MEDICINAL WATERS.

GENERAL IDEA OF PHILIPPINE SPRINGS.

EXISTENCE OF SPRINGS.

As we stated in treating of Orography, volcanic action has had such a great influence in the formation of the Philippine soil that it is readily understood that there must be in it a-multitude of minero-medicinal springs, as is in reality the case, although many of them still remain unknown from a scientific standpoint.

EXAMINATIONS MADE.

Before the year 1885 there had not yet been made any classification of the Philippine springs. In 1890 the report of the work of the first commission was published in Madrid, and in 1893 that of the second and last. From an attentive reading of both volumes it is inferred that the physical, chemical, and therapeutical examination of some 50 springs is the most complete and thorough that can be made in a country in which, as in the Philippines, traveling is so difficult and laborious on account of the absolute lack at times of good means of communication. Notwithstanding, there are a great many springs that have not yet been analyzed. We shall place here first those whose analysis is known, and afterwards add the others as they are supposed to be constituted. The first are taken from the reports of the above-mentioned commissions and are indicated, because it seemed to us most convenient, according to the alphabetical order of the provinces in which they are found.

Table of the springs (analyzed).

	Province or district.	Towns.	Location in township.	Name of spring.	Classification of the waters.	
					Temperature.	Composition.
1	Abra	Villavieja	Bacbac	Bacbac	Frías	Cloruradas, sódico-cálcicas.
2	Abra	Villavieja	Pideng	Pideng	Termales	Cloruradas, sódico-cálcicas, nitrogenadas.
3	Albay	Tivi	Malinao	Jigabo	Hipertermales	Sulfhidratadas, sódicas, bicarbonatadas, mixtas.
4	Albay	Tivi	Naga	Naglagbong	Hipertermales	Cloruradas, sódicas, silíceas.
5	Albay	Tabaco	Tancolao	Tancolao	Frías	Ferruginosas, sulfatadas, bicarbonatadas.
6	Ambos Camarines	Sipocot		Sipocot	Frías	Sulfhídricas, bicarbonatadas, cálcicas.
7	Ambos Camarines	Daet	Colasi	Lanot	Termales	Carbónicas, ferruginosas, bicarbonatadas.
8	Ambos Camarines	Goa	Lalo	Lalo	Hipertermales	Carbónicas, bicarbonatadas, mixtas, ferruginosas.
9	Ambos Camarines	Pasacao		Pasacao	Hipertermales	Cloruradas, sódicas, bicarbonatadas, cálcicas, nitrogenadas.
10	Bataan	Mariveles	Balong-anito	Balong-anito	Termales	Bicarbonatadas, cálcicas, sulfuradas, mixtas.
11	Batangas	Lian	Binobusan	Binobusan	Hipertermales	Cloruradas, sódicas, bicarbonatadas, cálcicas, nitrogenadas.
12	Batangas	Balayan	San Pedro	Gapas	Hipertermales	Bicarbonatadas, mixtas, nitrogenadas.
13	Batangas	Lemery	Sinisian	San Raimundo	Termales	Bicarbonatadas, cálcicas, arseniatadas.
14	Benguet	Tublay	Sayangan	Salvadora	Hipertermales	Sulfhídricas, cloruradas, sódicas, sulfatadas.
15	Benguet	Galiano	Sayangan	Asin	Hipertermales	Sulfhídricas, cloruradas, sódicas.
16	Benguet	Itogon		Meabe	Hipertermales	Sulfhídricas, cloruradas, sódicas, bicarbonatadas, mixtas.
17	Bulacan	S. Miguel de Mayumo	Sibul	San Jose	Hipertermales	Sulfhídricas, bicarbonatadas, cálcicas, nitrogenadas.
18	Bulacan	S. Miguel de Mayumo	Sibul	San Rafael	Hipertermales	Sulfhídricas, bicarbonatadas, cálcicas, nitrogenadas.
19	Bulacan	S. Miguel de Mayumo	Sibul	Santa Matilde	Hipertermales	Sulfhídricas, bicarbonatadas, cálcicas, nitrogenadas.
20	Bulacan	Norzagaray	Matictic	Dilain	Hipertermales	Sulfhídricas, cloruradas, sódico-cálcicas, nitrogenadas.
21	Bulacan	Norzagaray	Matictic	San Mariano	Hipertermales	Sulfhídricas, bicarbonatadas, cloruradas, sódico-cálcicas.
22	Cebu	Naga	Pandan	Candaguit	Hipotermales	Sulfhídricas, bicarbonatadas, cálcicas.
23	Cebu	Carcar	Guadalupe	Mulag	Hipotermales	Sulfhídricas, bicarbonatadas, cálcicas.
24	Cebu	Barili	Tagbag	Tagbag	Hipotermales	Sulfhídricas, bicarbonatadas, mixtas.
25	Cebu	Malabuyoc	Inamblan	Casipitan	Hipertermales	Sulfhídricas, carbonatadas, cálcicas.
26	Cebu	Santander	Mainit	Tanos	Hipotermales	Sulfhídricas, bicarbonatadas, cálcico-magnésicas.
27	Cotabato	Cotabato		Cotabato	Termales	Sulfhídricas, cloruradas, sódico-cálcicas, ioduradas.
28	Ilocos Sur	Magsingal	Maas-Asin	Magsingal	Frías	Cloro-ioduradas, sódicas, bicarbonatadas.
29	Ilocos Sur	Candon	Abgat	Abgat	Frías	Cloruradas, sódico-cálcicas, ioduradas.
30	Laguna	Jalajala	Lubo	Lubo	Hipertermales	Bicarbonatadas, cálcicas, cloruradas, sódicas.
31	Laguna	Mabitag	Galas	Galas	Hipertermales	Sulfhídricas, cloruradas, sódicas.
32	Laguna	Pagsanjan	Bombongan	Bombongan	Hipertermales	Bicarbonatadas, mixtas, nitrogenadas.
33	Laguna	Los Banos		Aguas Santas (A)	Hipertermales	Cloruradas, sódicas, bicarbonatadas, mixtas.
34	Laguna	Los Banos		Aguas Santas (B)	Termales	Bicarbonatadas, cálcicas, cloruradas, mixtas.
35	Laguna	Calamba	Pansol	Pansol	Termales	Bicarbonatadas, cálcicas, cloruradas, sódicas.
36	Lepanto	Angaqui	Tiquen	Cabab	Hipertermales	Sulfhídricas, sulfatadas, sódicas, nitrogenadas.
37	Lepanto	Angaqui	Madileg	Delong	Hipertermales	Sulfhídricas, sulfatadas, sódicas.
38	Lepanto	Cervantes		Cervantes	Hipertermales	Sulfatadas, cálcicas, clorurado-sódicas.
39	Lepanto	Comillas		Comillas	Hipertermales	Cloruradas, sódicas, ferruginosas.
40	Manila	Pasig	Santolan	Santolan	Hipertermales	Alcalinas, silicatadas, sódicas.
41	Morong	Bosoboso	San Jose	Mainit	Hipertermales	Sulfhídricas, nitrogenadas, sulfatadas, mixtas.
42	Morong	Cardona	Bolaboran	Bolaboran	Hipertermales	Sulfhídricas, cloruradas, sódicas, bicarbonatadas.
43	Nueva Ecija	Pantabangan	Sapang-Mainit	Sapang-Mainit	Termales	Sulfatadas, cálcico-sódicas, cloruradas.
44	Nueva Ecija	Rosales	Balungao	Napudut	Hipertermales	Sulfhídricas, cloruradas, cálcico-sódicas, iodo-bromuradas.

45	Pangasinan	Pozorrubio	San Nicolas	Nagtanglan	Frias	Bicarbonatadas, mixtas, cloruradas, sódicas.
46	Pangasinan	Mangataren	Manluluag	Manluluang	Hipertermales	Sulfhidricas, nitrogenadas.
47	Tarlac	O'Donell	Cauan	Cauan	Hipertermales	Sulfatadas, cálcicas, cloruradas, sódicas, nitrogenadas.
48	Tayabas	Lucban	Sampaloc	Apasan	Hipertermales	Sulfhidricas, cloruradas, sódicas, nitrogenadas.
49	Tayabas	Tayabas	Silang-Palali	San Emilio	Hipertermales	Sulfhidricas, cloruradas, sódicas, nitrogenadas.
50	Tiagan	Amamasan	Quensitog	Quensitog	Hipertermales	Sulfhidricas, sulfatadas, sódicas.

Besides the 50 springs that have been analyzed, there are 117 more, well known, although they have not yet been analyzed, which we enumerate below:

Springs whose waters have not yet been analyzed.

	Province or island.	Location.	Supposed class.
1	Cagayán	Aparri	Sulfurosas.
2	Cagayán	Aparri	Sulfurosas.
3	Cagayán	Aparri	Sulfurosas.
4	Cagayán	Al S. de la punta Escarpada	Saladas y termales.
5	Ilocos Norte	Bangui	Saladas y termales.
6	Ilocos Norte	Nagpartián	Saladas y termales.
7	Ilocos Norte	Vintar (Bisaya)	Bicarbonatadas, mixtas.
8	Ilocos Norte	A tres kilómetros de Bisaya	Saladas y termales.
9	Abra	San Guillermo (en el río)	Bicarbonatadas, mixtas.
10	Abra	Río Yenín	Bicarbonatadas, mixtas.
11	Abra	Balatoc (río Pascil)	Bicarbonatadas, mixtas.
12	Bontoc	Sadanga	Saladas, depósito ferruginoso con olor sulfhídrico.
13	Bontoc	Mainit	Saladas con olor sulfhídrico.
14	Bontoc	Talubín	Saladas con olor sulfhídrico.
15	Isabela	Angadanan	Termales.
16	Benguet	Buguias (Padungay)	Cloruradas, sódicas.
17	Benguet	Buguias (Asín)	Cloruradas, sódicas.
18	Benguet	Buguias (al Oeste)	Cloruradas, sódicas.
19	Benguet	Daclán (al ONO.)	Sulfhídricas.
20	Benguet	Daclán (Asín)	Cloruradas, sódicas.
21	Quiangán	Buyanbuyán (en el monte al Oeste)	Saladas.
22	Nueva Vizcaya	Bayombong (en la loma)	Saladas.
23	Nueva Vizcaya	Bambang (Amiguí No. 1)	Hipertermales, bicarbonatadas, cloruradas, sódicas.
24	Nueva Vizcaya	Bambang (Amiguí No. 2)	Hipertermales, bicarbonatadas, cloruradas, sódicas.
25	Nueva Vizcaya	Monte Blanco (Asín)	Cloruradas, sódicas.
26	Nueva Vizcaya	Ihín	Cloruradas, sódicas.
27	Nueva Vizcaya	Dagol	Cloruradas, sódicas.
28	Unión	Amsacón (río Bued)	Hipertermales, sulfhídricas, cloruradas, sulfatadas.
29	Binatangan	Quelingán (río Dicasignán)	Hipertermales, sulfhídricas, cloruradas, sulfatadas.
30	Príncipe	Baler (ríos Baler y Caliselan)	Hipertermales, sulfhídricas, cloruradas, sulfatadas.
31	Pangasinán	Aguilar	Termales.
32	Nueva Écija	Pantagambán (Cabuyao)	Termales.
33	Nueva Écija	Pantagambán (Cadaclán)	Termales.
34	Nueva Écija	Cuyapó (cerro Bancay)	Saladas.
35	Nueva Écija	Santor (Camaboy)	Termales.
36	Nueva Écija	Santor (arroyo Daguán)	Termales.
37	Zambales	Dasol	Termales.
38	Zambales	Paláuig	Termales.
39	Zambales	Iba	Termales.
40	Zambales	Cabangán (Calumejan)	Termales.
41	Zambales	Súbic	Ferruginosas.
42	Tárlac	Moriones	Ferruginosas.
43	Bulacán	San Rafael (camino de Daang-Partida)	Ferruginosas.
44	Pampanga	Pórac (hacienda de Pias)	Bicarbonatadas sódico-magnésicas.
45	Bataán	Mórong (origen del río Mórong)	(?)
46	Mórong	Tanay (río Lanatín)	(?)
47	Laguna	Calamba (Bocal)	Bicarbonatadas, cálcicas, cloruradas, sódicas.
48	Cavite	Indang (Arzobispo)	Sulfurosas, bicarbonatadas.
49	Tayabas	Tiaong	Ferruginosas.
50	Tayabas	Guinayangan	Ferruginosas.
51	Batangas	Lipa (Tatón)	Ferruginosas.
52	Batangas	Ibaán (Pangao)	Sulfurosas.
53	Batangas	Taysán	Sulfurosas.
54	Batangas	San Juan de Bocboc	Sulfurosas.
55	Ambos Camarines	Caramoan	Sulfurosas.
56	Ambos Camarines	San Fernando (Mainit)	Sulfurosas.
57	Albay	Daraca (Budiao)	Sulfurosas.
58	Albay	Camálig	Sulfurosas.
59	Albay	Legaspi (Marisbiris)	Sulfurosas.
60	Albay	Manito (punta Cáuit)	Siliceas.
61	Albay	Bulán (Lalisaga)	Siliceas.
62	Mindoro	Subaang	Termales.
63	Mindoro	Nauján (entre el mar y la laguna Nauján)	Termales.
64	Mindoro	Bulalácao (Damagán)	Cloruradas, sódicas.
65	Marinduque	Boac (Sabang)	Cloruradas, sódicas.
66	Marinduque	Gasán (Buenavista)	Cloruradas, sódicas.
67	Marinduque	Malbug	Cloruradas, sódicas.
68	Sámar	Calbáyog	Termales.

Springs whose waters have not yet been analyzed—Continued.

	Province or island.	Location.	Supposed class.
69	Sámar	Calbiga	Salobres.
70	Sámar	Calbiga	Bicarbonatadas.
71	Sámar	Guiaán (en la playa)	Ferruginosas.
72	Calamianes	Isla Busuanga (al pie del monte Tundalara)	Ferruginosas.
73	Cápiz	Ibajay (río Panacuyan)	Ferruginosas.
74	Antique	Barbaza	Ferruginosas.
75	Antique	Antique (arroyo Apdó)	Ferruginosas.
76	Antique	Aniniy (punta Siarán)	Termales, sulfhídricas.
77	Iloilo	Passi (Maasin)	Cloruradas, sódicas.
78	Iloilo	Dingle	Cloruradas, sódicas.
79	Iloilo	Alimodián	Cloruradas, sódicas.
80	Iloilo	Eubungan	Cloruradas, sódicas.
81	Leyte	Calbiran (río Calambis)	Cloruradas, sódicas.
82	Leyte	Masaplop	Alumbrosas.
83	Leyte	Biliran (punta Tinogdayan)	Sulfurosas.
84	Leyte	Ormoc (cerca de Dolores)	Sulfurosas.
85	Leyte	Burauen (monte To-od)	Sulfurosas.
86	Leyte	Laguna Jaruanan	Sulfurosas.
87	Leyte	Caballan (río Guintúluc)	Sulfurosas.
88	Cebú	Tagobón (Mabuli-Romero)	Termales, sulfurosas.
89	Cebú	Asturias (Aguas Calientes)	Termales, sulfurosas.
90	Cebú	Dumanjuc (Nagbatá)	Hipotermales, sulfhídricas.
91	Negros	Bacólod	Hipotermales, sulfhídricas.
92	Negros	Murcia	Hipotermales, sulfhídricas.
93	Negros	Sumag	Hipotermales, sulfhídricas.
94	Negros	Bago (barrio de Zaragoza, en 4 parajes)	Hipotermales, sulfhídricas.
95	Negros	La Carlota	(?)
96	Negros	Isabela	Bicarbonatadas.
97	Negros	Amblán	Bicarbonatadas.
98	Negros	Sibulan (al Noroeste)	Termales, sulfurosas.
99	Negros	Sibulan (San Antonio)	Termales.
100	Negros	Nueva Valencia (Mainit)	Termales.
101	Negros	Nueva Valencia (Maganó)	Sulfurosas.
102	Negros	Dauin (Lagit)	Hipertermales, sulfatadas, cloruradas, sódicas.
103	Negros	Dauin (origen del río de este nombre)	Sulfurosas.
104	Bohol	Guindulman (Boboc)	Sulfurosas.
105	Bohol	Tagbilaran (Dáuit)	Sulfurosas.
106	Isla de Panglao	Dauis (Bingan)	Sulfurosas.
107	Isla de Siquijor	San Juan (monte Condoón)	Sulfurosas.
108	Isla de Siquijor	Napo	Sulfurosas.
109	Isla de Siquijor	Tabod	Sulfurosas.
110	Isla de Siquijor	Cabalaguin	Sulfurosas.
111	Surigao	Tungao	Ferruginosas.
112	Surigao	Placer	Sulfurosas.
113	Surigao	Mainit (Mapaca)	Sulfurosas.
114	Camiguin	Catarman	Sulfurosas.
115	Misamis	Balingasag	Sulfurosas.
116	Pigtao	Pigtao	Sulfurosas.
117	Dávao	Malibato	Termales.

NOTE ON THERMO-MINERAL SPRINGS.

From the "Memoria Geológico-Minera de las Islas Filipinas" of the inspector-general of mines, Mr. Centeno, we take the following:

We have already briefly indicated, in treating of volcanoes, the existence of sulphurous thermal springs in the settlements of Magangan and Buguias in the district of Lepanto. In the distance which separates the settlement of Magangan from that of Acual, there are a multitude of jets of sulphurous water with a strong smell of rotten eggs and with temperatures varying from 16° to 50° C. One of these springs is remarkable, because it throws out almost constantly a great quantity of black mud, which has the same odor as the waters, and of the composition of which we are ignorant. In the proximity of all these springs a great quantity of sulphur has been deposited, which on account of being of no use there, no one has taken the trouble to exploit. From Acual one can go to Amblimay, 5 leagues distant, by a good and pleasant road, passing by the settlements of Lutap and Cabayan, noted for their agricultural wealth and fisheries, and from the latter point Buguias may be reached by following the course of the river Agno, which must be crossed many times in the short distance of half a league which separates the two towns. The village of Buguias is located on the side of the mountain, in which the springs appear at a very short distance from it and a little higher up. The water from the 37 jets which appear within a very short distance is very salt and of such a high tempera-

ture that the skin can not stand it more than two or three seconds. From these waters the natives extract the small quantity of common salt they need for consumption.

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The province of Batangas is also very rich in mineral waters, for, besides the sulphuric waters of the volcano of Taal, of which we shall speak further on, there are several important springs in it. In the township of San Luis, at a place called Mainit (hot), some jets of hot water gush from the ground, which leave an abundant ferruginous sediment. The waters of the brook Panipil, near the town of Lemery, are very sulphurous and are used with good results by the natives for cutaneous diseases. In the territory of the same town, on the road which leads to Calacá, at a place called Matasnabayan, there are also some springs which are little known and used. In the mountains of Taypán also there are hot springs whose composition is unknown to us, but which are used by the natives with good results for diseases of the bladder and cutaneous diseases. Besides the water is used as an efficacious purgative in many cases. Finally, to the southeast of Bauan, near Point Cazador, there is another small spring, to which all afflicted with rheumatism and paralysis resort in search of relief from their sufferings, and which they usually find.

The volcano of Taal is found in this same province, in the crater of which there is a small lake of water charged with sulphuric acid.

* * * * * * *

Very near this interior crater and toward the east a small lake is seen, whose dark-green waters emit clouds of sulphurous vapors, and whose shores are formed of lava and salts, which must be magnesia, lime, and soda, as we shall soon see from the analysis which we shall present of said waters. The extent of this interior lake varies frequently, but it is hardly ever less than 60 meters in diameter.

* * * * * * *

The interior crater has a circumference of 80 meters, approximately, and in the bottom is seen, when one descends by the walls of the old crater, a yellowish liquid in a state of violent ebullition, which with subterranean noises appears and disappears with marvelous rapidity, presenting points of lively combustion and occasioning the column of vapors which ascend into the atmosphere from the center of the large crater.

The water of the interior lake has the following composition:

	Per cent.
Sulphuric acid	2.98
Hydrochloric acid	3.16
Ferruginous oxide	1.00
Clay	1.04
Magnesia	0.20
Lime	0.08
Soda	1.02
Water	90.52
	100.00

Of the 2.98 parts of sulphuric acid, 2.47 were found free, or not combined.

In the province of Albay, near the town of Tivi, and at a place called Jigabo, there are several thermic springs of different temperatures, some containing a large quantity of sulphur, which is precipitated when the sulphureted hydrogen decomposes, and others have a gelatinous silica in solution, which the waters on cooling deposit on objects dipped into them, incrusting them in a short time with remarkable perfection.

The sulphurous springs appear at several points along the channel of a small stream, whose waters, of the ordinary temperature, conveniently mixed with the water from the hot springs, make baths of any temperature that may be desired. Underneath the round stones which make the bed of the brook there are found small deposits of sulphur sublimate, and at certain places in a pasty state and colored by metallic oxides, which are used in that locality for paint. The second—that is to say, the siliceous springs—appear some 200 meters from the first, and are much more remarkable, not only on account of the greater space they occupy, but also on account of their very high temperature (108° centigrade) and the very beautiful siliceous concretions they produce, sometimes consisting of flattened cones with cylindrical terminations, perfectly joined and with bands of different colors, sometimes forming small cylindrical and semi-spherical hollow crystals, wholly filled with quiet and transparent hot water. In these waters, with a little care, the purest siliceous incrustations can be obtained by simply putting the molds in them for a few days.

These thermo-mineral waters, which have not been known very long, have, however, begun to be used with astounding success for certain infirmities, and we have seen cases of chronic rheumatism and paralysis completely cured in a short time.

THERAPEUTIC PROPERTIES OF CERTAIN SPRINGS.[1]

ACIDULATED, CARBONIC, FERRUGINOUS, AND BICARBONATED WATERS.

LANOT SPRING.

The spring of Lanot is in the village of Colasi, township of Daet, province of Ambos Camarines.

Therapeutic application.—The large quantity of free carbonic acid which these waters contain deprives them completely of the disagreeable taste characteristic of all ferruginous waters, and as such there may be treated by them, with great probability of success, especially those morbid states which are characterized by the diminution of red corpuscles.

Assisting the action of the carbonic acid, the bicarbonates of lime and magnesia will have a favorable effect on various diseases of the digestive organs, especially those which are caused by a defect in their regular action.

Special indications.—Gastralgias, dyspepsias, gastric and intestinal catarrhs, anæmia, and chlorosis.

Use.—Drink.

ALKALINE-BICARBONATED WATERS.

SAN RAIMUNDO SPRING.

The spring of San Raimundo (Calauan) is located in the ward of Simsian, town of Lemery, province of Batangas. When the natives of this neighborhood began to use these waters for the treatment of their diseases, they gave them such a reputation that from 300 to 400 individuals bathed in them daily, and in their ignorance they attributed marvelous cures to them.

It is preferable to use these waters in baths, rubbing the skin a great deal with the mud from the bottom of the spring, the diseases treated by it being so different that it is possible there is not a single one that has not been submitted to the test of its efficacy. The indication of arsenic, which the analysis shows, gives these waters great value, because they are the only ones of their class that the commission was able to study.

Special indications.—Chlorosis, anæmia, chronic metritis, gout, uric diathesis, and catarrhs of the genito-urinary mucus.

Common indications.—Neuralgias, menstrual disturbances, neuropathic effects, and gastro-intestinal catarrhs.

Use.—Drink and bathe in.

Season.—From November to May.

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[1] Taken from the "Estudio descriptivo de algunos manantiales minerales de Filipinas," issued by the commission composed of D. Enrique Abella y Casariego, inspector-general of mines; D. José de Vera y Gómes, physician, and D. Anacleto del Rosario y Sales, pharmacist. Manila. Tipo-Litografía de Chofré y Cía., 1893.

SAN MARIANO SPRING.

The spring of San Mariano of Nagtanglan is in the town of Pozorrubio, province of Pangasinan.

Special indications.—Scrofula, tuberculosis, gout, diabetis, rickets, and dermatosis.

Common indications.—Gastro-intestinal catarrhs, dyspepsias, and catarrhs of the respiratory and genito-urinary organs.

Use.—Drink and bathe in.

Season.—From December to May.

GAPAS SPRING.

The spring of Gapas is in the town of Balayan, province of Batangas.

Special indications.—Rheumatism of slight intensity, gout, and hysteria.

Common indications.—Catarrhs of the stomach and dyspepsias, with pyrosis.

Use.—Drink and bathe in.

Season.—From November to May.

SULPHUROUS-SULPHOHYDRIC WATERS.

MAINIT SPRING.

The spring of Mainit is in the town of Bosoboso, district of Morong.

Special indications.—Herpetism, catarrhal affections of the respiratory organs, and habitual costiveness.

Common indicutions.—Lymphatism, visceral rheumatism, syphilis, and scrofula.

Use.—Drink and bathe in.

Season.—From February to May.

BICARBONATED-CALCIC WATERS.

CANDAGUIT SPRING.

The spring of Candaguit is found in the town of Naga, district of Cebu.

Special indications.—Dermatosis, chronic catarrhs of the genito-urinary organs, infarctions of the abdominal viscera, and menstrual disturbances.

Common indications.—Chronic catarrhs of the respiratory organs, dyspepsias, and gastralgias.

Use.—Drink and bathe in.

Season.—From November to May.

CASIPITAN SPRING.

The spring of Casipitan de Inamblan is in the town of Malabuyoc, district of Cebu.

Special indications.—Rheumatism, gout, neuralgia, paralysis, pulmonary tuberculosis, chronic bronchial catarrh, chronic catarrhs of the genito-urinary organs, infarctions of the abdominal viscera, uric diathesis, menstrual disturbances, and leucorrhœa.

MULAG SPRING.

This is in the town of Carcar, district of Cebu.

Special indications.—Dermatosis, chronic catarrh of the genito-urinary organs, infarctions of the abdominal viscera, menstrual disturbances, and leucorrhœa.

Common indications.—Chronic catarrhs of the respiratory organs, dyspepsias, and gastralgias.

MIXED BICARBONATED WATERS.

TAGBAG SPRING.

The spring of Tagbag or Bolocboloc is in Barili, town of Cebu.

Special indications.—Dermatosis, chronic catarrhs of the genito-urinary organs, infarctions of the abdominal viscera, gout, uric diathesis, menstrual disturbances, and leucorrhœa.

Common indications.—Chronic catarrhs of the respiratory organs, dyspepsias, gastralgias, and hysteria.

Season.—From February to May.

TANON SPRING.

The spring of Tanon (Mainit) appears in the town of Santander, district of Cebu.

Special indications.—Dermatosis, rheumatism, gout, uric diathesis, chronic catarrhs of the genito-urinary organs, and infarctions of the abdominal viscera.

Common indications.—Dyspepsias with pyrosis, chronic gastro-intestinal catarrh, catarrhal and chronic ulcers of the stomach, neuralgias, and hysteria.

SULPHATED SODIC WATERS.

QUENSITOG SPRING.

The spring of Quensitog is in the settlement of Amamasan, command of Tiagan.

Special indications.—Chronic catarrhs of the respiratory organs, hemoptysis, incipient tuberculosis, rheumatism, paralysis, herpetic and scrofulous dermatosis, and habitual costiveness.

Common indications.—Verminous affections and visceral infarctions.

Use.—To drink, bathe in, and inhale.

Season.—From November to April.

CABAD SPRING.

The spring of Cabad is in Tiquen, district of Lepanto.

Special indications.—Chronic catarrhs of the respiratory organs, hemoptysis, incipient tuberculosis, rheumatism, paralysis, herpetic and scrofulous dermatosis, and habitual costiveness.

Common indications.—Verminous affections, visceral infarctions, and polysarcia.

Use.—To drink, bathe in, and inhale.

ASIN SPRING.

This is in Dilog, district of Lepanto.

General indications.—Chronic catarrhs of the respiratory organs, hemoptysis, incipient tuberculosis, rheumatism, paralysis, herpetic and scrofulous dermatosis, and habitual costiveness.

CHLORO-SODIC WATERS.

SALVADORA SPRING.

This is found in the district of Benguet.

Special indications.—Constitutional diseases of the skin and mucous membranes, herpetic and scrofulous dermatosis, bronchio-pulmonary catarrhs, rheumatism, paralysis, and hydrargyrism.

Common indications.—Visceral infarctions, syphilis, and chronic catarrhs of the digestive and biliary passages.

MEABE SPRING.

The spring of Meabe is in the town of Itogon, district of Benguet.

Special indications.—Constitutional diseases of the skin and mucous membranes, herpetic and scrofulous dermatosis, bronchio-pulmonary catarrhs, rheumatism, paralysis, and hydrargyrism.

Common indications.—Visceral infarctions, syphilis, and chronic catarrh of the digestive and biliary passages.

BOLABORAN SPRING.

The spring of Bolaboran appears in the town of Cardona, district of Morong.

Special indications.—Herpetic and scrofulous dermatosis, catarrhal affections of the respiratory organs, arthritism, syphilis, and visceral infarctions.

Common indications—Hemorrhoids, chronic catarrhs of the digestive and biliary passages, traumatic diseases, wounds, and atonic ulcers.

CHLORATED SODIC-CALCIC WATERS.

COTABATO SPRING.

The spring of Cotabato is in the town of this name, capital of the fifth district of Mindanao.

Special indications.—Herpetism, scrofula, and lymphatism in their different manifestations in the skin and mucous membranes, goiter and indurations of the cellular and glandular tissues.

Common indications.—Secondary and tertiary syphilis, muscular and articular rheumatism, infarctions of the abdominal viscera, especially of the liver and spleen, and abdominal plethora.

Use.—To drink, bathe in, and inhale.

CHLORATED, SODIC, BICARBONATED, AND CALCIC WATERS.

BINOBRESAN SPRING.

The spring of Binobresan is found in Lian, a town of Batangas.

Special indications.—Chronic gastro-intestinal catarrh, ulcers of the stomach, acid dyspepsia, visceral infarctions, and anorexia.

Common indications.—Catarrhal states of the respiratory organs, hemoptysis, and the initial stage of tuberculosis.

SULPHATED, CALCIC, CHLORATED, AND SODIC WATERS.

CAUAN SPRING.

This spring is in the town of O'Donnell, province of Tarlac.

Special indications.—Rheumatism, gout, uric diathesis, catarrhs of the genito-urinary organs, neuropathic diseases, hysteria, and neuralgias.

Common indications.—Lymphatism, scrofula, chronic gastro-intestinal catarrhs, infarctions of the abdominal viscera, acid dyspepsia, wounds, and ulcers.

PAPER NO. IV.

MINERAL RESOURCES AND GEOLOGY.

MINERAL RESOURCES AND GEOLOGY.

By Geo. F. Becker, U. S. Geologist.

Nothing approximating to a complete geological reconnaissance of the Philippines has ever been made. There were earnest men among the Spanish geologists, however, and Messrs. Centeno and Abella deserve much credit for what they accomplished with small appropriations and little encouragement from the Spanish Government. Visiting geological explorers have also contributed important observations, in particular Messrs. Richthofen, Semper, and Drasche. The conditions are not all favorable to rapid work. The enormous coast line, estimated by the Coast and Geodetic Survey at 11,444 miles, would indeed afford great facilities to a geological expedition properly equipped with a steam vessel and launches; but none such, I believe, has ever been organized. In the interior of the islands roads are few and bad; the vegetation is so dense and matted that it is often impossible to leave the regular trail excepting by cutting a new path, and the damp, motionless atmosphere in the jungle is precisely like that of a hothouse. Under such circumstances progress in geological mapping must inevitably be slow.

The additions which it has been possible for me to make to the geology of the islands are small, in spite of a residence of fourteen months. I was not allowed to do any work, except within the military lines of the United States forces, without a special escort of soldiers, which events proved to be anything but unnecessary. Moreover, it was only occasionally that the situation justified the authorities in placing an escort at my disposition, for deliberate exposure of soldiers' lives for the purpose of gaining geological information was not to be thought of, although volunteers for such service could have been obtained in any number. I made examinations at various points on Manila Bay, as well as along the railway from Manila to San Fernando, and cruised about Laguna de Bay, touching at many points. I also spent a month in Negros and another in Cebú, passed some time at Iloilo, touched at Guimaras, visited Jolo, and coasted along the island of Mindanao, though without being able to land.

A report is in preparation in the office of the Geological Survey which is intended to embody all that is at present known on the geology and mineral resources of the archipelago. In the meantime an outline is presented here in the form of brief memoranda. That on the mineral resources was prepared in Manila in September, 1898, at the request of Admiral Dewey and as a report to him.[1] It is reproduced

[1] This memorandum appears in the Nineteenth Annual Report, Geological Survey.

here with one or two unimportant changes. A supplemental note embodies some pertinent facts extracted from a report to the commission recently made by the Jesuit fathers. The memorandum on the general geology was addressed to General Otis in September, 1899, at the close of field work in the island.[1]

MEMORANDUM ON MINERAL RESOURCES.

This brief memorandum probably covers all the main discoveries in the geology of the Philippines which are of economic interest. It is drawn up from data recorded in the Spanish mining bureau (Inspección de Minas), but not published; manuscript mine reports by the late William Ashburner; verbal information obtained in Manila, and various technical publications of Semper, Santos, Roth, Drasche, Abella, and others.

Only about a score of the islands are known to contain deposits of valuable minerals. These are arranged below in the order of their latitude, to give an idea of their geographical distribution and to facilitate finding the islands on the map. The latitude of the northern end of each is taken as that of the island. The character of the valuable minerals stated in the table will afford a general notion of the resources of the islands.

Mineral-bearing islands and their resources.

Island.	Latitude (north end).		Character of mineral resources.
	°	′	
Luzon	18	06	Coal, gold, copper, lead, iron, sulphur, marble, kaolin.
Polillo	15	01	Coal, gold, iron.
Catanduanes	14	15	Gold.
Lubang	13	85	Gold, copper, lead.
Marinduque	13	06	Lead, silver.
Mindoro	13	05	Coal, gold, copper.
Carraray	13	35	Coal.
Batan	13	03	Do.
Rapu-Rapu	13	25	Do.
Masbate	12	06	Coal, copper.
Romblon	12	06	Marble.
Samar	12	07	Coal, gold.
Sibuyan	12	05	Gold.
Capul	12	05	Copper.
Semirara	12	01	Coal.
Panay	11	09	Coal, oil, gas, gold, copper, iron, mercury (?).
Biliran	11	07	Sulphur.
Leyte	11	06	Coal, oil, mercury (?).
Cebu	11	03	Coal, oil, gas, lead, silver, iron.
Negros	11	00	Coal.
Dinagat	10	45	Gold.
Bohol	10	15	Do.
Panaon	10	15	Do.
Mindanao	9	85	Coal, gold, copper, platinum.
Calumangan	(?)		Lead.
Sulu Archipelago	6	30	Pearls.

The distribution of each mineral or metal may now be sketched in somewhat greater detail. In many cases the information given in this abstract is exhaustive, so far as the available material is concerned. The coal fields of Cebu, however, have been studied in some detail by Mr. Abella, and in a few other instances more extended information has been condensed for the present purpose.

[1] Printed in the Twentieth Annual Report of the Geological Survey.

Coal.—So far as is definitely known, the coal of the Philippine Islands is all of Tertiary age, and might better be characterized as a highly carbonized lignite. It is analogous to the Japanese coal and to that of Washington, but not to the Welsh or Pennsylvania coals. Such lignites usually contain considerable combined water (8 to 18 per cent) and bear transportation ill. They are also apt to contain much sulphur, as iron pyrite, rendering them subject to spontaneous combustion and injurious to boiler plates. Nevertheless, when pyritous seams are avoided and the lignite is properly handled it forms a valuable fuel, especially for local consumption. In these islands it would appear that the native coal might supplant English or Australian coal for most purposes. Lignite is widely distributed in the archipelago; some of the seams are of excellent width, and the quality of certain of them is high for fuel of this class.

Coal exists in various provinces of the island of Luzon (Abra, Camarines, Bataan, Sorsogon). The finest beds thus far discovered appear to be those in the small island of Bataan, lying to the east of the southern portion of Luzon, in latitude 13° 19′. These seams vary from 2 feet 6 inches to 14 feet 8 inches in thickness. Analyses have been made in the laboratory of the Inspeccion de Minas, and the mean of seven analyses gives the following composition:

Analysis of coal from Bataan, one of the Philippine Islands.

Constituent.	Per cent.
Water	13.52
Volatile matter	37.46
Fixed carbon	44.46
Ash	4.56
Total	100.00

One pound of this coal will convert 6.25 pounds of water at 40° C. into steam at 100° C. The heating effect is about three-fourths that of Cardiff coal. The same beds are known to exist in other small adjacent islands, Carraray and Rapu-Rapu. A number of concessions for coal mining have also been granted on the main island of Luzon just south of Bataan, at the town of Bacon. No doubt the beds here are either identical or at least closely associated with the coal seams in the little islands.

The coal field of southern Luzon is said to extend across the Strait of San Bernadino into the northern portion of Samar. Here coal is reported at half a dozen localities, but I have been able to ascertain no details as to the thickness or quality.

In Mindoro there are large deposits of coal in the extreme southern portion (Bulacao) and on the small adjacent island of Semirara. This fuel is said to be similar to that of Bataan.

The islands of Masbate and Panay contain coal, the deposits of which thus far discovered do not seem of much importance. Specimens from the southwestern portion of Leyte, analyzed in the laboratory of the Inspeccion de Minas, are of remarkably high quality, but nothing definite about the deposit is known to me.

The first discovery of coal in the archipelago was made in the island of Cebu in 1827. Since then lignitic beds have been found on the

island at a great variety of points. The most important croppings are on the eastern slope within some 15 or 20 miles of the capital, also named Cebu. Though a considerable amount of coal has been extracted here, the industry has not been a profitable one hitherto. This is, at least in part, due to crude methods of transportation. It is said, however, that the seams are often badly faulted.

At Uling, about 10 miles west of the capital, the seams reach a maximum thickness of 15½ feet. Ten analyses of Cebu coal are at my disposal. They indicate a fuel with about two-thirds the calorific effect of Cardiff coal, and with only about 4 per cent ash. Large quantities of the coal might, I suspect, contain a higher percentage of ash.

The island of Negros is nearly parallel with Cebu and appears to be of similar geological constitution, but it has been little explored, and little of it seems to have been reduced to subjection by the Spaniards. There are known to be deposits of coal at Calatrava, on the east coast of Negros, and it is believed that they are of important extent. In the great island of Mindanao coal is known to occur at eight different localities, but no detailed examination of any kind appears to have been made. Seven of these localities are on the east coast of Mindanao and the adjacent small islands. They indicate the presence of lignite from one end of the coast to the other. The eighth locality is in the western province, called Zamboanga, on the Gulf of Sibuguey.

Petroleum.—In the island of Cebu petroleum has been found associated with coal at Toledo on the west coast, where a concession has been granted. It is also reported from Asturias, to the north of Toledo, on the same coast, and from Algeria to the south. Natural gas is said to exist in the Cebu coal fields. On Panay, too, oil is reported at Janinay, in the province of Iloilo, and gas is reported from the same island. Petroleum, highly charged with paraffin, is also found on Leyte, at a point about 4 miles from Villaba, a town on the west coast.

Gold.—Gold is found at a vast number of localities in the archipelago, from northern Luzon to central Mindanao. In most cases the gold is detrital, and is found either in existing water courses or in stream deposits now deserted by the current. These last are called "aluviones" by the Spaniards. It is said that in Mindanao some of the gravels are in an elevated position and adapted to hydraulic mining. There are no data at hand which indicate decisively the value of any of the placers. They are washed by natives, largely with cocoanut shells for pans, though the batea is also in use.

In the province of Abra, at the northern end of Luzon, there are placers, and the gravel of the river Abra is auriferous. In Lepanto there are gold quartz viens as well as gravels. Gold is obtained in this province close to the copper mines. In Benguet the gravels of the river Agno carry gold. There is also gold in the province of Bontoc and in Nueva Ecija. The most important of the auriferous provinces is Camarines Norte. Here the townships of Mambulao, Paracale, and Labo are especially well known as gold-producing localities. Mr. Drasche, a well-known German geologist, says that there were 700 natives at work on the rich quartz veins of this place at the time of his visit, about twenty-five years ago. At Paracale there are parallel quartz veins in granite, one of which is 20 feet in width and contains a chute in which the ore is said to assay 38 ounces of gold to the ton. One may suspect that this assay hardly represented an aver-

age sample. Besides the localities mentioned, many others in this province have been worked by the natives.

The islands of Mindoro, Catanduanes, Sibuyan, Samar, Panay, Cebu, and Bohol are reported to contain gold, but no exact data are accessible.

At the south end of the small island of Panaon, which is just to the south of Leyte, there are gold quartz veins, one of which has been worked to some extent. It is 6 feet in thickness and has yielded from $6 to $7 per ton.

In the island of Mindanao there are two known gold-bearing districts. One of these is in the province of Surigao, where Placer and other townships show gravels and veins. The second district is in the province of Misamis. Near the settlement of Iponan, on the Gulf of Macajalar, there are said to be many square kilometers of gravels carrying large quantities of gold, with which is associated platinum. The product of this district was estimated some years since at 150 ounces per month, all extracted by natives with bateas or cocoanut-shell dishes.

Copper.—Copper ores are reported from a great number of localities in the Philippines. They are said to occur in the following islands: Luzon (provinces of Lepanto, Benguet, and Camarines), Mindoro, Capul, Masbate, Panay (province of Antique), and Mindanao (province of Surigao). Many of these occurrences are probably unimportant. The great island of Mindanao, being practically unexplored, is full of possibilities, but as yet no important copper deposit is known to exist there. An attempt was made to work the deposit in Masbate, but no success seems to have been attained. On the other hand, northern Luzon contains a copper region which is unquestionably valuable. The best-known portion of this region lies about Mount Data, a peak given as "2,500 meters?" in height, lying in latitude 16° 53′ N., longitude 120° 58′ east of Greenwich, or 124° 38′ east of Madrid. The range of which Data forms one peak trends due north to Cape Lacay-Lacay, and forms a boundary for all the provinces impinging upon it.

Data itself lies in the province of Lepanto. In this range copper ore has been smelted by the natives from time immemorial, and before Magellan discovered the Philippines. The process is a complicated one, based on the same principles as the method of smelting sulphosalts of this metal in Europe and America. It consists in alternate partial roasting and reduction to "matte" and eventually to black copper. It is generally believed that this process must have been introduced from China or Japan. It is practiced only by one peculiar tribe of natives, the Igorrotes, who are remarkable in many ways.

Vague reports and the routes by which copper smelted by natives comes to market indicate that there are copper mines in various portions of the Cordillera Central, but the only deposits which have been examined with any care are those at Mancayan (about 5 miles west of Mount Data), and two or three other localities within a few miles of Mancayan. The deposits of Mancayan are described as veins of rich ore, reaching 7 meters in width and arranged in groups. Mean assays are said to show over 16 per cent of copper, mainly as tetrahedrite and allied ores. The gangue is quartz. The country rock is described as a large quartzite lens embedded in a great mass of trachyte. An attempt has been made by white men to work these deposits, but with no considerable success. The failure does not seem to have been due to the quality or quantity of ore found.

Lead and silver.—A lead mine has been partially developed near the town of Cebu, on the island of the same name.

The most important deposit of argentiferous galena is said to be at Torrijos, on the small island of Marinduque (latitude 13° 6′). A metric ton, or 1,000 kilograms, is said to contain 96 grams of silver, 6 grams of gold, and 565.5 kilograms of lead.

In Camarines, a province of Luzon, lead ores occur, but are worked only for the gold they contain.

Iron.—There is iron ore in abundance in Luzon, Cebu, Panay, and doubtless in other islands. In Luzon it is found in the provinces of Laguna, Pampanga, and Camarines Norte, but principally in Bulacan. The finest deposits are in the last-named province, near a small settlement named Camachin, which lies in latitude 15° 7′, and longitude 124° 47′ east of Madrid. A small industry exists here, wrought iron being produced in a sort of bloomery and manufactured into plowshares. The process has not been described in detail, so far as I know. It would appear that charcoal pig iron might be produced to some advantage in this region. The lignites of the archipelago are probably unsuitable for iron blast furnaces.

Quicksilver.—Rumors of the occurrence of this metal in Panay and Leyte have failed of verification. Accidental losses of this metal by prospectors or surveyors sometimes lead to reports of the discovery of deposits, and ochers are not seldom mistaken for impure cinnabar.

Nonmetallic substances.—Sulphur deposits abound about active and extinct volcanoes in the Philippines. In Luzon the principal sulphur deposits are at Daclan, in the province of Benguet, and at Colasi, in Camarines. The finest deposit in the archipelago is said to be on the little island of Biliran, which lies to the northwest of Leyte.

Marble of fine quality occurs on the small island of Romblon (latitude 12° 6′). It is much employed in churches in Manila for baptismal fonts and other purposes. Marbles are also quarried at Montalban, in the province of Manila, and at Binangonan, in the province of Morong.

There are concessions for mining koalin at Los Banos, in Laguna province.

Pearl fisheries exist in the Sulu Archipelago, and are said to form an important source of wealth.

SUPPLEMENTAL NOTE.

The Jesuit Fathers report the sulphide of antimony (stibnite) as occurring at Paracale, in the province of Camarines, and as found also in Zambales province. It does not appear whether in either case the mineral is sufficiently abundant to be regarded as an ore deposit. So, too, zinc, both as the sulphide and as silicate, exists at Paracale, seemingly in connection with lead ores and gold. Such information as I have would point to the conclusion that the zinc ores are to be regarded rather as metallic gangue minerals than as separate deposits, but my information is insufficient to decide this question definitely.

Deposits of rock salt occur in Mount Blanco and Bamban (Nueva Ecija), in Calamba (Laguna), and in Placer (Surigao, Mindanao). As might be supposed, the natives extract much of their salt from the sea water. Niter is found in caves at some points in the Philippines, very probably originating in the dung of bats and other animals. It has been collected by the insurgents for the manufacture of gunpow-

der. Among the localities where it is known are the small island of Masapilit and the town of Placer, in Mindanao.

Beautiful serpentine is found in Santa Cruz (Zambales), and the same mineral is widely distributed in the islands. Gypsum is plentiful in the eastern part of the central range of Luzon. Opal is said to occur at Binangonan (Morong) and at Catbalogan, in the island of Samar. This mineral is a very common one in volcanic regions; but the valuable variety, fire opal, is rare. Lithographic stone is found at San Mateo, province of Manila. Should this turn out to be of good quality and in large blocks, the deposit would be a treasure.

The clays of Los Banos (Laguna) and of Maunrigao (Surigao, Mindanao) are said to be comparable with the best Chinese and Japanese kaolins. If this is true, it would be easy to import expert potters from those countries. Asphalt is reported in Luzon in Camarines, between Lakes Buhi and Bato, as well as in Mindanao at Hinatuan, in the province of Surigao.

MEMORANDUM ON GEOLOGY.

Much office work must be done on the specimens collected and much literature abstracted before all of the information at my command on the geology of the Philippine Islands can be systematically presented.

So far as my observation or my information goes, the geological history of the whole group is similar. I have seen that the Post-Tertiary gradual upheaval, presently to be described, is common to Jolo, Mindanao, Luzon, and the intermediate islands; and descriptions leave little doubt that the Philippines belong, and have long belonged, to a single geological and biological province.

Prior to the Tertiary epoch the Philippines consisted of slates and igneous masses, the age of which is as yet unknown, no fossils having been detected in these ancient rocks. They are now to be found chiefly in the northern and eastern ranges of Luzon, but appear to be represented also by some limited occurrences in Cebu, and seem to form the walls of the gold-bearing quartz veins of the province of Surigao, in the northeastern portion of Mindanao. They are doubtless in reality widely distributed, but in most localities are buried beneath more recent formations.

During the Eocene, or earliest Tertiary, the archipelago must have consisted largely of swamps and shallow seas, perhaps not very different from those now existing in the same region. Limestones were formed at some distance from the coasts, shales and sandstones were laid down near the shores, and accumulations of vegetable matter grew in the swamps. These last were covered by mud, and, in the almost total absence of free oxygen, they were gradually converted into lignite, probably the most valuable mineral asset of American India.

At the close of the Eocene a great crumpling and upheaval took place, which was felt from Switzerland to the Philippines, and perhaps most of all in the Himalayas, where marine Eocene beds now stand at an elevation of 16,000 feet above the sea. In these islands the Eocene strata are frequently thrown into a nearly vertical position and sometimes are actually overturned. In the Visayas the axis of upheaval trended a little east of north, corresponding to the direction of greatest extension of the islands of Cebu and Negros. These disturbances were accompanied by much faulting and it is believed by some metamorphism. Intrusions and extrusions of igneous rocks seem to have accompanied

this upheaval, but no satisfactory study has yet been made of the phenomena, good exposures being rare.

During the remainder of the Tertiary the islands appear to have been above water. Miocene and Pliocene strata have not been detected with certainty, though some traces of such beds will probably be discovered in future investigations. Near Jolo I found strata which appeared to be younger than the Eocene and older than the Recent period. In the main, the area of the Philippines was probably then continental, and there is zoological evidence of a land connection with the Asiatic continent, probably by way of Borneo, during the Middle Tertiary. This connection did not persist to the close of the Tertiary, however, and to its rupture are ascribable the extraordinary peculiarities of animal life in these islands, evolution here having been left to take its own course undisturbed by invasions.

The subsidence which cut off immigration of the lower animals continued, seemingly, till somewhere about the close of the Tertiary, and long after *Homo sapiens* had made his appearance in the Malay Archipelago. This group also was very probably already inhabited during the Pliocene, possibly by the ancestors of the Negritos. This is a matter which requires careful investigation, for in the opinion of my late famous colleague, O. C. Marsh, this archipelago is likely to have been one of the earliest haunts of the human species.

When the elevation was at its minimum the archipelago was reduced to a group of small, hilly islets, four of which existed within the area now occupied by the island of Luzon. Cebu was almost completely submerged.

At or before the period of maximum subsidence, began a series of eruptions which has not yet closed. Mayon Volcano, in southern Luzon, had a violent eruption in 1897. It is probably the most beautifully symmetrical volcanic cone in the world, and the truncation at the top, due to the crater, is scarcely sensible.[1] The work done in fusing lavas and ejecting ash is probably a manifestation of the energy involved in the mighty earth throes which bring about regional upheavals with incidental subsidences. The earlier of the eruptions under discussion were largely submarine, and vast additions were made to the superficial material of the archipelago by these outflows, especially in the central and southern portions of Luzon. The ejecta include andesites, rhyolites, basalts, and probably other less common rock species.

The period of upheaval, once initiated, does not seem to have been interrupted by any era of subsidence, and the modern coral reefs give evidence that it is still in progress. It is said that uplifts accompanying earthquakes have actually been observed by the Spaniards, and the earthquakes themselves are spasmodic jars in the process of elevation. The elevation has not been, properly speaking, catastrophic, however, for the tremors which may wreck a cathedral are insignificant from a terrestrial standpoint. On the whole, the uplift has been very gradual, so that even the coral polyp has been able to adjust himself to the changing conditions, building outward into deeper water as his old home was raised too high for his welfare. In this way nearly the whole of Cebu, to a height of over 2,000 feet, has been covered with a nearly continuous sheet of coral which can be followed seaward into living reefs. Much of Negros has been clothed with a similar mantle. On a

[1] The radius of any horizontal section is the hyperbolic sine of the distance from this section to the summit.

small scale, also, off the coasts of these islands, and particularly about Mactan, reefs can still be studied in every stage of upheaval, all those portions being dead which are exposed to the air even at the lowest tides. In southern Luzon and to the northward of Lingayen Bay similar phenomena can be observed.

Although upheaval does not appear at any time since the close of the Tertiary to have given way to subsidence, there have been repeated pauses in the uplifting process. On exposed coasts these pauses are marked by benches eaten into the land by the action of the waves. Thus the southern ends of Cebu and Bohol are terraced from top to bottom, each terrace being an old bench cut out of the rock mass by stormy seas. Pauses in the uplifting process are also marked by a rude stratification of the corals. Even in the interior of the islands terraces indicative of uplifts are frequently visible. Some of them represent base levels of erosion, others are ancient coral reefs which have been checked in their upward growth by reaching the surface of the water. In short, terraces constitute one of the most prominent topographical features of the archipelago.

The slowness of the uplift is emphasized by the stupendous accumulation of coral in these islands. Coral is, of course, mainly composed of calcium carbonate, and this is formed by the coral polyp from the lime salts dissolved in the sea. Now, the sea contains a very minute proportion of lime salts (chiefly the sulphate, or gypsum), say a tenth of 1 per cent, and corals are necessarily of slow growth because of the scantiness of the material with which they build. The sheets of coral on uplifted areas seem to have a tendency toward a nearly uniform thickness, approximating to 100 feet. This is explicable from the habits of the coral animal, which does not grow at a greater depth than 15 or 20 fathoms. Unlike merely sedimentary strata, the coral follows the topography of the rising surface along a contour of which it grew. Where muddy waters or frequent eruptions befoul the sea there are no coral reefs.

When the uplift began, say ten or twelve thousand years ago, the island shores were steep and the sea about them was relatively deep, so that an upheaval of 100 feet added but little to the area of the islands. As the amount of uplift increased to something approaching the mean depth of the circumambient sea, the area of the land increased in a far greater ratio to the increment of upheaval. The last rise of 100 feet has rescued from the seas the most valuable part of the archipelago. Examination of the charts will show that a fresh rise of 100 feet would add a further area, which, though important, would be less important than the actual lowlands of the Philippines. The plateau on which the island stands is now mostly above sea level.

Area has been added to the land by the formation of deltas at the mouths of the rivers, a process which has been greatly assisted by the mangrove trees and the nipa palms. These grow in the water in all favorable situations, and hold back the solid contents of the streams, adding their own débris to the accumulation. Along the eastern shore of Manila Bay the so-called "estero" or "bayou" country consists of the confluent deltas of the various rivers flowing into the bay.

To the eastward of the estero country the ground passed over by General MacArthur's army from Manila to San Fernando consists of low, base-leveled terraces, all more or less dissected by water courses. These almost always have somewhat high and steep banks. They are

in fact engorged, as is characteristically the case in a country undergoing upheaval; for upheaval increases the potential energy of the flowing water and leads to erosion of the stream beds.

In my published memorandum on the mineral resources of the Philippines,[1] I have briefly noted the distribution of valuable minerals. The distribution of gold deposits indicates that this metal, when in place, is associated with the older rocks, and it will probably be found that the last great addition to the auriferous deposits was an incident of the Post-Eocene upheaval. In some parts of the world gold is found in neo-volcanic rocks, as at Bodie in California, and elsewhere. I have learned of no such occurrence in these islands. Where streams in the Philippines cut into the older rocks they seem nearly always to carry a little gold, which the natives have been exploiting time out of mind.

There is a very general impression that Mindanao is a rich auriferous region, though little definite information is current on the subject. The absence of information seems to add the attractions of the imagination to the tales of a few prospectors. It is a fact, to which attention should be called, that each of the two auriferous provinces of Mindanao—viz, Surigao and Misamis has been reported upon by a competent expert and that neither expert found anything to excite his enthusiasm. There is gold there, beyond a doubt, and the natives have been extracting it on a modest scale, yet with no little skill, for centuries. The information at hand points to very moderate auriferous resources, comparable with those of the Carolinas and Georgia rather than with those of Colorado or California.

Luzon, so far as I can judge from reports, is as rich in gold as Mindanao. It is probable enough that a fair number of spots exist in which capital invested in gold mines will find reasonable renumeration, but I fear that any "rush" to the gold fields will involve great disappointment. The whole archipelago has an area almost the same as that of Arizona. There is nothing known which indicates that the islands contain more gold than this Territory.

The copper doposits of Lepanto seem rich and extensive, but very expensive roads will be needed to render them available. The high quality of some of the iron ores of Luzon is beyond question, but the lignite of the islands is not adapted to iron smelting. A moderate industry could be based on charcoal smelting, while the pig iron could be converted into steel and manufactured by the use of furnaces burning lignite gas.

The so-called coal is a good lignite. Its heating effect is from two-thirds to three-fourths that of the best steaming coal. There are great quantities of this fuel, and much of it could probably be delivered at a profit on vessels at $2.50 (Mexican) per ton. The lignite is at least as good as the Japanese "coal," which is also lignite. The Japanese fuel often brings $9 or $10 (Mexican) in Manila, and is now much dearer; so that unless the price of such coal were to fall enormously, great profits await the coal miner. The development of a coal industry is of great importance to the industries of the archipelago, and though our naval vessels would prefer Cardiff or Pocahontas coal, they could use Philippine lignite in case of need.

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[1]Nineteenth Ann. Rept. U. S. Geol. Survey, Part VI Continued, 1898, pp. 687–693.

PAPER NO. V.

BOTANY.

INTRODUCTION.

As the Philippine Archipelego, situated between 5 and 21 degrees north latitude, is made up of a large number of islands, has great variations in the elevation and composition of its land, and is subject to various winds, it necessarily presents marked variation in its vegetation.

In general the flora is tropical. In the south of Mindanao, or in the Jolo Archipelago, it is beyond doubt equatorial, as is shown by the presence of the durian (*Durio zibethinus*) and the mangosteen (*Garcinia mangostana*). In Mindanao this character gradually disappears, preserving the tropical form as far as the north of Luzon. The dividing line of these two floras is about at the parallel of Manila, as, from there toward the south, such tropical families as Myrtaceæ, Lauraceæ, Urticaceæ, Araceæ, and Orchidaceæ abound, while toward the north the pine, not found in the south, covers considerable areas, especially in the northwest of Luzon.

So, too, there are some notable differences in the vegetation on the Pacific coast and that of the China Sea. In the former region the rains are more copious, while in the latter, which is covered with compact mountain ranges, and which has a more limited agricultural zone, there are magnificent and splendid virgin forests containing an abundance of ferns, orchids, palms, aroids, and Melastomaceæ, and although the fir tree is not found, others, such as the almaciga (*Agathis loranthifolia*), various species of Podocarpus, and the agojos (*Casuarina equisetifolia*) grow luxuriantly. So, too, in regions where the hand of man has not interfered with nature, two kinds of vegetation are seen; either the land is covered with extensive forests or with thick grass of various species, the greater part belonging to the genera Saccharum, Anthistiria, and Imperata. And, finally, a study of the distribution of species in relation to various latitudes and altitudes shows the Philippine flora quite analogous to that of Sumatra and different from that of Java, there being a less number of species here than in Sumatra. It is worthy of note, also, that identical species are less abundant on the Pacific coast than on the coast of the China Sea.

The acceptable classification made by D. Sebastian Vidal makes a division into two classes: Forest flora and agricultural flora. The first is divided as follows: (a) Mangrove swamp. (b) Vegetation along the seashore. (c) Vegetation in the lowlands of less than 200 meters altitude. (d) Vegetation of the zone between 200 and 1,000 meters of elevation. (e) Of the mountain zone between 1,000 and 1,800 meters. (f) Of the higher mountain zone between 1,800 and 3,000 meters. The second class is made up of various cultivated plants of commercial or other uses.

It seems, however, both practical and convenient to leave this scientific classification, and to divide this treatise into chapters as hereinafter appear.

BOTANY.

CHAPTER I.

GRAMINEOUS PLANTS (GRASSES).

We include in this group species of the family of grasses which are of great interest in the Philippine Archipelago, serving as food for man and beast, and as articles of common use for the natives. Among these are rice and corn, grass and reed grass, and the common cane or bamboo.[1]

PALAY, OR RICE (*Oryza sativa* L.).

This cereal, native to the marshy regions of hot countries, is one of the most important of this class as a food stuff and industrial product. It is the principal food of all Eastern peoples. In the Philippines it is the principal crop upon which the sustenance of the indigenous population depends. All the other crops together would not be sufficient to cover the loss of this one, upon which the poor classes depend. A large number of varieties exist, as was seen in the collection presented by D. Regino Garcia at the Colonial Exposition, in Amsterdam, and which contain more than 120 varieties. The collection of 120 varieties presented by Senor Garcia at the Exposition of Paris in 1878, received the only gold medal presented by the judges to Philippine exhibitors. Two main divisions are made, according to the manner of cultivation. First, those varieties cultivated on the lowlands (irrigated lands), and second, those cultivated on uplands (dry lands), the latter being more numerous. Rice is supposed to be of Asiatic origin, and is the plant concerning whose cultivation the most ancient documents exist. Its introduction into the Philippine Archipelago was much anterior to the discovery of the islands. Morisqueta, or rice boiled in water without salt, is looked upon by the natives in the same way as we look upon bread.

The varieties of greatest importance are: Mimis, greatly esteemed on account of its white, transparent grain and exquisite flavor; Dumali, an early variety; Bontot-cabayo, and others which may be cultivated either on lowland or on highland.

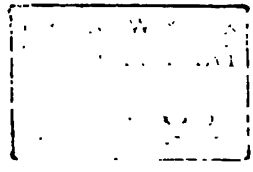
The cultivation of rice is one of the few occupations which the native pursues with care, although they do not have at their command everything necessary to make the production most profitable. For the cultivation of lowland rice the ground is divided into little parcels, generally rectangular, and having a slight inclination, and which are surrounded with little dikes called pilapil, which serve to retain the water. The rice is sown by hand in little beds of moist earth. This seed rice is selected during the springtime. While these seed beds are

[1] We do not include sugar cane in this group, considering it a commercial product which will be included in the last group.

PLOWING A FIELD FOR RICE.

PLANTING RICE.

RICE PADDIES.



REAPING RICE.

HAULING ZACATE.

STACKING RICE.

sprouting the flooded lands are worked, the carabao (water buffalo), which serves admirably for this purpose, being used. In this way the soil is worked into a soft mud. When the rice has grown to a height of 20 centimeters it is pulled from the beds, formed into bundles, and taken to the place where it is to be transplanted. Regular lines of little holes are made in the softened earth, in each of which is placed a little bunch of six or seven stalks. The soil is not fertilized, nor is any other care given to the crop. When harvest time comes, which is usually in August, or from that time on, according to the variety of rice and the character of the soil, the plants are cut one by one, by means of a little sickle, or the yatap. This latter instrument consists of a little blade of steel or of tin, semicircular in form, fixed into a little handle.

This palay is now placed in heaps called mandalas. The grain is now separated from the straw by thrashing, in which operation water buffalo play an important part. At other times this thrashing is accomplished by pounding the straw in a large wooden mortar, called a lusong, or simply by striking the bundles against a stone. When there is sufficient wind the grain is separated from the straw and the dust by its use. It is finally separated from the husk by pounding it two or three times in the wooden mortar, or by making use of a sort of handmill, called guilingan.

On the highlands it is necessary to go over the ground two or three times and break up all clods. The seed is sown by hand after the first heavy rains, and without other care the crop is finally collected. The natives of the interior, and even some of those of the Christian towns, are accustomed to plant rice on virgin soil, in the preparation of which they are compelled to cut down all trees. Some of these are burned and others are used to make fences about the field.

The rice plant has many enemies, the most important of which is the locust, which, when it appears, totally destroys the crops. Another insect attacks the young and tender grain, sucking out the juice and leaving it completely empty. Another enemy is the maya (*Munia oryzivora*, L.), a small bird abundant in the lowlands. Sometimes monkeys injure the crop in certain regions.

The production of rice has diminished in the Philippines on account of the increased production which has taken place in adjacent countries. The Chinese market, to which formerly a large amount of Philippine rice was exported, supplies itself at present with greater economy and in greater abundance with the rice from Cochin China. This latter place even supplies the Philippines with rice whenever the crops are short. Again, lands which formerly produced rice for export are now given over to the cultivation of sugar cane with great advantage to the general wealth of the country.

CORN (*Zea mays* L.).

Corn is a cereal which sometimes gives abundant crops. It is a monoicous plant of great importance on account of its grain, its flour making excellent food. It is used likewise as food for cattle, as are the leaves and young stalks, which make excellent fodder. And, finally, an alcoholic drink, which the Bisayans call pangasi, is made from it. It is of American origin, from whence it was carried by the Spaniards. At first the natives received it with indifference until, on account of frequent losses of the rice crops, they became accustomed to its use.

Its cultivation has become quite generalized throughout the archipelago, especially in those regions where the soil is not altogether suitable for the cultivation of rice, as in Cagayan and Isabela. In many towns it has taken the place of morisqueta, being reduced to a coarse granular flour by means of the guilingan, and then boiled in water without salt.

ZACATE (*Grass*).

Under this name are included several species of grasses which make up the forage of the live stock, especially horses. The chief ones of these belong to the genus Leersia. The fields where this grass is raised are the objects of much care on the part of the native farmer, especially if they are in the vicinity of large centers of population, as the returns are excellent. The grass is cut several times a year.

COGON (*Saccharum koenigii* Retz).

This grass reaches the height of 2 meters, forming a sort of forest almost impossible to traverse without first making a path, either by means of fire or with a knife. The natives, with the object of obtaining fodder, are accustomed to set fire to these grass fields in the dry season. They are thus able to obtain the young shoots, which when not more than 18 inches in length are much relished by cattle. In regions where the nipa does not grow, cogon is used for thatching the houses.

SORGHUM OR BATAD (*Holcus saccharatus* Bl.).

Although this plant has given excellent results in the United States and other places when cultivated for sugar or the production of alcohol, in the Philippines it is used only for fodder. This is true of a number of other plants belonging to the genera Paspalum, Milium, Panicum, Sporolobus, Chloris, Avena, Poa, Bromus, Agrostis, etc., which grow on the pastures of the mountains.

BAMBOO.

Under this name are included various species of cane of the genus Bambusa, which are of great importance in the Philippines. The principal species are *Bambusa diffusa* Bl., *B. monogyna* Bl., or *Cauayang quilang* B., *pungeas* Bl., or Cauayang totoo, *Bambusa mitis* Bl., or Taivanæ, *Bambusa lima* Bl., or Anos, and *Bambusa textoria* Bl., or Calbang. All of these bamboos are used for many things, but the most useful of all is the Cauayang totoo, which at times reaches a diameter of more than 20 centimeters and a height of more than 12 meters. It is employed principally in the construction of native houses, which are often made wholly of bamboo, except for the rattan used to tie it together and the cogon used as thatch. The posts, floor, rafters, and doors are all made of bamboo, and the native is very skillful in working it. Either entire or split into strips, it is used in the construction of boats, rafts, bridges, aqueducts, scaffolding, vessels of all kinds, baskets, furniture, fishing apparatus, arms, rope, etc. This plant, together with the cocoanut tree, the nipa palm, and the rattan, are truly providential for these countries.

PLANTING ZACATE.

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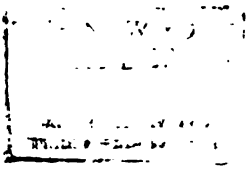
A FIELD OF ZACATE (GRASS).



CARRYING ZACATE (GRASS FOR FODDER).

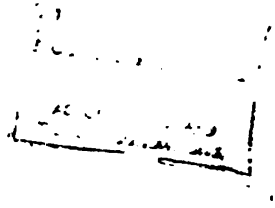


PLATE X.

A CLUMP OF BAMBOO.

BAMBOO USED FOR A BRIDGE.

RAFTING OF BAMBOO.

THE NEW
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CHAPTER II.

VEGETABLES.

In this chapter are included those plants of the family Leguminosæ which serve as food, those whose tubers are edible, those roots which are edible, and, finally, the plants cultivated in the gardens.

DIVISION A.—LEGUMES.

MONGO, FRIJOL, AND OTHERS.

Leguminous plants are of but little importance in this country. One of the most commonly cultivated is the mongo (*Phaseolus mungo* Bl.), smaller than the lentil, but of the same flavor, and which is cultivated on a large scale, as it is the principal food of many towns. The butingui (*Phaseolus vulgaris* L.) is the true kidney bean, which is found in considerable variety in the garden. The zabache (*Phaseolus lunatus* L.) is also greatly prized. The sitao (*Phaseolus caracalla* L.) produces a vegetable about a foot long. The frijol from Abra (*Phaseolus tunkinensis* Lour.), and the patani (*Phaseolus inamomus* L.) are both highly prized by the natives. There are also some species of the genera Dolichos, Vigna, Pachyrhizus, and Prophocarpus, which produce vegetables or edible seeds less highly esteemed than those of the genus Phaseolus.

DIVISION B.—TUBERS.

SWEET POTATOES (*Ipomœa batatas* Lamk.).

Although the origin of this plant has been much discussed, it is believed to have come from America. Its tuber, which is commonly called camote, is very suitable for food, and its cultivation is greatly favored by mountain races, which would seem to favor the antiquity of its introduction. The plant grows in five or six months, extending its shoots in all directions, completely covering the soil with its abundant leaves, which are likewise edible. When the ground is given over to the exclusive cultivation of this plant it is allowed to take root in all directions, and as the roots extend and grow the tubers continually, they may be dug up for use at any time of the year. When its cultivation alternates with that of rice or corn it is necessary to plant anew each year, the product usually being of greater value than in the previous years.

THE POTATO (*Solanum tuberosum* L.).

This plant originally came from the Andes, and was introduced into Spain after the conquest of Peru. After that its use extended over

the rest of Europe, especially after the tests by Parmentier, who during the last century demonstrated that the potato was not poisonous, as was believed, but that, on the other hand, it was very useful as a food. These tubers have about 20 per cent of solid matter, and more than 80 per cent when desiccated at a temperature of 120 degrees. In Europe they form the basis of the food supply of the lower classes, and are of industrial value, especially in the manufacture of alcohol.

In the Philippine Archipelago this valuable tuber has not done well, and is only cultivated with success in certain elevated localities, such as the District of Benguet.

DIVISION C.—ROOTS.

GABE (*Colocasia esculenta* Schott).

This plant, introduced a long while ago from Asia, is to-day extensively cultivated in almost all the islands, especially in the mountain regions. Its large roots and young leaves make an excellent food for the natives. The badiang, which is cultivated principally in the Visayas, has the same uses. There are three principal varieties, the best known of which is the variegata.

UBE, TUQUI, ETC.

Various species of the same genus Dioscorea are found either growing spontaneously or being cultivated for their edible roots. Among these are the ube (*Dioscorea alata*), the tuqui (*D. sativa* L.), the paquit (*D. divaricata* L.), the nami-conot (*D. pentaphylla* L.), the tongo (*D. papillaris* L.), and others. They all have large roots and sometimes attain enormous sizes. They may be eaten boiled or without other preparation than leaving them in water for some days. The tuqui and the ube, being most highly prized, are most extensively cultivated. The rhizome of this latter makes a healthy food of a sweet taste. It is somewhat sour when raw, but is rendered sweet and nutritious by boiling. Its cultivation is simple, somewhat similar to that of the potato. It is necessary to carefully prepare these tubers for eating, for when this is not done they are poisonous.

DIVISION D.—GARDEN PLANTS.

PRINCIPAL SPECIES CULTIVATED IN THE PHILIPPINES.

Although the natives do not care much for the cultivation of these plants, gardens are found near the large centers of population, generally cultivated by Chinese, the products being used by Europeans. Among those cultivated are the following: Onions, garlic, asparagus, radishes, cabbages, artichokes, endives, peppers, tomatoes, carrots, celery, parsley, and the haras (*Anethum fœniculum*), a native plant whose fruit contains seeds having a sweet flavor similar to anise. Of the family Cucurbitaceæ there are also a large number of plants which are generally eaten boiled. Among these are the common squash, of which there are several varieties, the condol (*Cucurbita aspera*), which is oval in shape and very suitable for making sweets. A variety of squash known to the natives as calabasang bilog (*Cucurbita sulcata*),

VEGETABLE GARDENS (SANTA ANA).

P O—VOL 8—01—26

TAGALOG BOYS CARRYING VEGETABLES TO MANILA.

which is of a green color, much prized and extensively cultivated, and the tabayag (*Lagenarie vulgaris*), the meat of which is soft and smooth to the touch. The genus *Cucumis* is represented by no less than four species in the Philippines. The tabacog (*Cucumis melo*), which is the true melon, and which, although possessing a delightful aroma, never reaches the excellent flavor of those of Europe. The pepino, or cucumber, which is eaten boiled or pickled. The patola (*Cucumis acutangulus*), large in size, and eaten green or boiled. The milondaga (*Cucumis luzonicus*), small in size and with a flavor similar to the cucumber, and the watermelon, sandia, or pacuan.

Albay is the only locality where the strawberry occurs.

CHAPTER III.

FIBER-PRODUCING PLANTS.

IMPORTANCE.

The so-called textile plants are those which furnish fiber for the manufacture of cloth, cordage, etc. They are called industrial because of the large number of hands employed in the manufacture of these products in the great manufacturing centers. The principal ones found in the Philippines are hemp, cotton, the pineapple plant, ramie, agave, cabo-negro, rattan, pandan, and palma buri.

MANILA HEMP (*Musa textilis* L.).

This plant is greatly appreciated for the excellent quality of its fiber, which constitutes one of the chief articles of exportation. Its principal cultivation is in the provinces of Ambos Camarines, Albay, Sorsogon, and Catanduanes, in the islands of Samar and Leyte, and on a smaller scale in Cebu, Mindoro, Marinduque, and the north of Mindanao. In Negros it grows well only in the southern part, and in Panay the small quantity gathered is of inferior quality. The fiber is obtained from the outer of the sheathing leafstalks, which in these plants forms the apparent trunk, as in bananas. This sheath is cut into lengths and then into strips, which are called sajas. There are many varieties of hemp, in some places as many as fourteen. The differences between these consist in variations in color in the bulb and lower part of the trunk, in the greater or smaller number of shoots, and in the development and strength of the fiber. In Albay experts distinguish varieties according to the size of the stalk, the shape and size of the leaves, and especially according to the strength of the fiber in the sajas. Even though experts recognize these characteristics in each variety, it is very difficult to do it at first sight, as the different names given to the different varieties in the different localities cause some confusion in the determination of them.

Cultivation.—This plant needs a moist climate, the lack of which is sometimes supplied by planting trees, which furnish shade and prevent the loss of water, which, by evaporation, is continually going on from the broad leaves. These trees also aid by drawing moisture to the surface by means of their long roots. Trees having high branches, narrow leaves, and deep roots are those most serviceable for this purpose. The land should be open and moist, but not swampy. Sloping lands having a clay soil, situated on the hillsides or mountain sides, are suited to the cultivation of this plant. The best fertilizer is the refuse of the plant itself left after the extraction of the fiber, as this contains the same elements which have been taken from the soil. Other articles, such as ashes, or any substance which contains potash and soda, may be used. New plants are grown from shoots or suckers, called by the natives saja, which grow about the base of the plant. The plants may

be grown likewise and with considerable economy from tubers and from seed, but these methods are rarely used. For new plantations recently cleared mountain lands are used, a few trees being left for shade, the trunks and branches of the others being burned. After the ground has cooled the shoots are planted in little holes 1½ or 2 meters apart. As the little shoots are very slow in growing, some other plant is usually sown on the same field to check the growth of weeds which might destroy the hemp plant. For this purpose the sweet potato is most serviceable. At the end of three years the plant has reached its full development, the most suitable time for cutting being when the fruit begins to show, as the fiber is then in the best condition. The trunk is cut down with a sharp machete or knife. The lower part of the trunk and the leaves are then cut off and the external layers of the plant or those containing the fiber are then removed and carried to the workhouse where the fiber is extracted.

Enemies of the hemp plant.—Two insects, the larvæ of which are called by the natives tamiloc and amarog, pass through the metamorphosis in the trunk of this plant. The former of these measures about 4 centimeters in length, the latter 1½ centimeters. A large hole may be observed somewhere about the lower part of the plant attacked, which soon assumes a yellow color and dries up before reaching half its full size.

Production and prices.—There has been a constant increase in the area of land devoted to the cultivation of hemp. It is estimated that the annual production of the archipelago is more than 1,000,000 piculs. Hemp is classified in commerce in three grades—current, second, and colored. The price of the first grade between the years 1885 and 1894 varied between $17.12, its highest price, and $6, the lowest price, per kilogram. The other two classes sell at prices from 25 to 40 per cent lower than the first. All of these prices are those of the market of Manila, being somewhat less in the provinces.

The cultivation of hemp began to assume important proportions in the Philippines in 1855, at which time it was second in importance among articles of export from these islands. It is exported principally to the United States and to England, small quantities going to Spain, Australia, Singapore. and China.

COTTON (*Gossypium herbaceum* L.).

This plant is cultivated in the Philippines and the provinces of North and South Ilocos, Union, Pangasinan, and Abra. The species cultivated are *Gossypium herbaceum* and *G. perenne* and *Ceiba pentandra.* The first two are known to the natives as capas and bobuy, and the latter as capasanglay. They are respectively herbs, bushes, and trees. The capas or herb is the only one which is really cultivated and whose product is used in the manufacture of cloth. The others are found growing wild, the cotton being used only for making pillows and mattresses.

Cultivation and preparation.—The soil should be open, strong, and easy to work, and should be deeply plowed and carefully prepared. It should be planted, when there is no danger of heavy rains, in furrows a meter apart, the plants being an equal distance apart in these furrows. When the fruit is ripe it is collected and the cotton is passed through a series of manipulations, rendering it suitable for the manufacture of cloth. The first operation is the separation of the cotton

from the husk, after which the fiber is separated from the seed, to which it strongly adheres. This operation is accomplished by the means of a little hand machine, called laddit, which is composed of two parallel wooden cylinders revolving in opposite directions. The cotton is passed between the cylinders and separated from the seed. With this primitive apparatus one man working ten hours can obtain 3 or 4 kilograms of clean cotton. The cotton is then spread on drying tables, after which it is ready for spinning.

The enemies of the cotton plant which menace production are the curiat, or field cricket; a gray caterpillar which is the larva of a butterfly (*Noctua subterranea*); and the larva of *Melolontha vulgaris*, called by the natives abaleng.

PINEAPPLE (*Bromelia ananas* L., or *Ananasa sativa* Lindley).

A plant of the family Bromeliaceæ, which is cultivated for its delicious fruit and for the fiber which is obtained from its leaves. This latter is similar to that obtained from the agave. Its origin is tropical America, from whence it was spread to Africa, Oceania, and even to Europe. The pineapple has about the same geographical distribution as coffee, but is grown on some mountains at an altitude not suitable for coffee. It requires an even temperature which does not fall below 18° C. It will grow on almost any kind of ground, but gives best results in open, strong soil. It grows from the seed, which is sown in parallel lines 1¼ meters apart, the individual plants being one-fourth meter from each other. In Cuba it is cultivated almost exclusively for its fruit, which has an exquisite flavor, and is sweet, aromatic, and slightly tart, on account of the presence of malic acid, which makes it somewhat indigestible. In the Philippines it is of more importance as a textile plant.

Method of obtaining the fiber.—The fruit of the plant is first cut so that the leaves may become as long and broad as possible. When these leaves are well developed they are torn off and then scraped with a fragment of glass or some other sharp instrument so as to separate the fleshy part and leave the fibers behind. It is then washed, dried in the sun, and combed out. It is classified in four grades, according to its fineness, and is then employed in the manufacture of fabrics in the same way as Manila hemp. The finer filaments are woven in very rough looms into a most delicate cloth. This commands a high price, and is used for making handkerchiefs, waists, and other garments. This cloth is very highly prized in the Philippines, as much as 20,000 reals having been paid for a single embroidered suit.

RAMIE (*Boehmeria nivea*).

This plant, of the family Urticaceæ, probably has its origin in Java, Sumatra, or the southern part of China. It is a nettle, like those of Spain, but without needles. It is cultivated for its fiber, which is formed on the outer part or bark of the plant. It grows to a variable height, according to climate and soil, of between 1 and 2½ meters. Beyond doubt the famous Canton linen is manufactured from this excellent fiber, which rivals flax. In spite of the excellent quality of this fiber the cultivation of this plant has not increased, on account of the difficulty of extraction, which can only be profitably done with

BUNDLES OF RATTAN.

special machinery. In the Philippines it is found only in the Batanes Islands and the north of Luzon.

The plant *Urtica arborescens* Bl. or Dalonot, whose fiber is employed for the same purposes, also exists.

AGAVE (*Agave americana* L.).

This plant, belonging to the family Amaryllidaceæ, comes originally from America. Its fleshy, sharp leaves, bordered with a row of spines, furnish a fiber from which delicate cloth called nipis is made. It is cultivated on a small scale in certain localities in the Philippines. The Tagalogs call it magui, or magüey. It is exported in bulk to England, China, Japan, and Egypt.

CABO-NEGRO (*Arenga saccharifera* Labill.; *Caryopa onusta* Bl.).

This plant, called cauong by the natives, belongs to the family of palms. Along the edge of the stem of the leaf are long, black, and very strong fibers, which are useful for the manufacture of ropes and cordage. These are very durable and resist moisture and even salt water. It is used also in making walls or partitions, and has some other uses which will be mentioned later.

RATTAN (BEJUCO).

Of the genus *Calamus* there are several species called by the natives dilan, yantoc, talola curag, and palasan. These spiny, climbing plants, which sometimes attain a length of 200 meters, furnish to the natives a useful material of most extended application. All the framework of the houses built of bamboo and nipa, and many of those built of wood, are held together only by strongly laced bands of rattan, this article supplying the place of nails. These rattans are also employed in the rigging of all the smaller boats, and in the making of rafts, etc. In some of the provinces hats and sacks or bags are made from rattan, and in other places chairs and other articles of furniture.

PANDAN (*Pandanus spiralis*, Bl.).

This plant belongs to the family *Pandanaceæ*. Its leaves are used for the manufacture of hats and sacks, an industry developed in Lucban and the province of Tayabas. The huge, wide leaves of the palm called buri (*Corypha umbraculifera* L.) are also used for this purpose. In the same way the split stems of the leaves of the nito (*Lygodium semihastatus* Del.) are utilized.

CHAPTER IV.

PLANTS FROM WHICH OIL IS OBTAINED.

COCOANUT (*Cocos nucifera* L.).

This is one of the most important plants of the archipelago, satisfying as it does with its various products so many industrial, economic, and medicinal wants. It will be discussed here simply as an oil-producing plant.

It belongs to the family of palms and comes from India. Many varieties are found in the Philippines, especially in the Visayan Islands. The chief ones of these are called cayumanus, limbaon, dahlili, and macapuno, the chief points of difference being in the fruit.

Cultivation.—This plant will grow almost anywhere and does not demand any particluar kind of soil. Nevertheless, if a plantation is to be established it is best to choose land situated near the sea, having a reddish soil mixed with sand, as the salt water and the regular winds seem to benefit the trees. It is not expedient to place plantations on highly elevated ground, as the winds easily uproot many trees. Young trees grow from the perfectly ripe fruit. In Cuba, where the cultivation of the fruit is carried on with much care, beds for sprouting the seed are made in suitable soil and the young trees are carefully guarded. In the Philippines the nuts are placed without any preparation close together in beveled beds, where they are exposed to the influence of the air. In following this procedure it is a year before the plant reaches a height of a meter. Another and shorter method is to hang the nuts on trees in such a way that they are partially protected from the sun, but exposed to atmospheric influences. In this way the plants will attain the height of a meter within five months. The small trees are now transplanted into previously prepared soil. The holes in which they are placed should be not less than 1½ meters in diameter in loose soil and 2 to 3 meters in mountain soil. The plants should be from 8 to 12 meters apart, according to the character of the soil, and the transplanting should be done just before the beginning of the rainy season. After planting they require but little care. Weeds must be kept out, insects destroyed, the dry leaves cut away, and in certain cases, when the dry season is very prolonged irrigation must be resorted to during the first few years. It is a good idea to cultivate some other crop, such as corn or the mungo, for the first few years. On good land the plantations begin to bear fruit at the end of seven years; on poor lands no fruit is borne for ten or twelve years.

Diseases.—The diseases of the cocoanut tree are brought about by atmospheric conditions or by animal or vegetable parasites. Among the first may be mentioned excessive humidity, especially when the water lies about in pools, and an unusually prolonged dry season, very strong winds, and earthquakes. Earthquakes produce such an effect upon the vegetative functions of the tree that ordinarily many of the nuts drop off within a short time. Among animals may be mentioned

crows, rats, and bats, which cause but little damage. Locusts at times devastate the plantations, eating not only the leaves but the leaf ribs. Hogs sometimes destroy the young trees. The beetles *Rhyncophora ochreatus*, *Eydana*, and *Rhyncophora pascha* Bohem., called by the natives Bagañgan, penetrate the terminal bud of the tree and destroy it in a few days. These insects are destroyed by pouring into the holes they make ashes, sand, or an infusion of tobacco. Among parasitic plants may be mentioned a fungus (*Uredo cocivora*). This microscopic plant collects on the terminal bud of the tree and destroys the outer covering of this organ, the fungus appropriating the nutritive elements to its own use. This operation destroys the tree in a short time, as the fungus multiplies from its spores with great rapidity. The best treatment consists in destroying the affected or suspected trees with fire.

The analysis of the meat of the cocoanut, according to Buchwer, is as follows: Water, 31.8 per cent; stearin and olein, 47 per cent; albumen sulphate of calcium and sulphur, 4.3 per cent; potassium and other salts, 11 per cent; insoluble woody fiber, 8.6 per cent.

The nuts are collected every four months. They are taken to market in such vehicles as are used in the country or, if possible, by water, when a raft is formed of the cocoanuts themselves, having simply a rope about them to prevent them from separating. The owner rides on top of this raft of cocoanuts.

Uses.—When the fruit is to be used for the manufacture of oil a disk of the outer husk called by the natives bonot is first cut from either end. The rest of the husk is then removed by means of a conical-pointed iron which is fixed in a piece of wood. The inner covering, or shell, is then divided into two parts. The adherent meat is then separated from the shells by means of a semicircular knife fixed in a wooden support, or perhaps by a spherical iron grater, which is fastened to the end of a wooden shaft lying horizontally and which is turned by means of pedals. When extracted in this manner the meat of the nut is deposited in a large wooden tub which has a hole in the bottom for the escape of the oil, which flows from the mass simply by exposure to the sun; but this process is very long, as to extract all of the oil requires a month or more. It is likewise very imperfect, as the decomposition of extraneous material imparts to the oil a dark color and an almost insupportable odor. A better and more general method of extracting is by means of fire. The cocoanut meat is placed in suitable receptacles or in specially prepared ovens and boiled, or it is placed in large kettles having a slow fire underneath. During the boiling a froth containing extraneous material is thrown away. It is usual to express the oil from the meat, as a much larger quantity is obtained. If the nuts are good ones, and the operation is done with care, 5 liters of oil should be obtained from 30. The natives use this oil as a condiment, and while still fresh as a purgative. It is greatly used for lighting purposes and in the manufacture of soaps. Both in the Philippines and Europe it is used in the manufacture of perfumery.

BENNE SEED—(SESAMA, or AJONJOLI) (*Sesamum orientale* L.).

This plant, belonging to the family Pedaliaceæ, has been known in the Orient from the most remote time, and is to-day cultivated in all tropical countries. The seeds of this plant contain as much as 53 per cent of fixed oil. This oil, somewhat similar to olive oil, and often mixed with it to adulterate it, has a sweet taste, although more insipid

CHAPTER IV.

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than olive oil, and is very slow in becoming rancid. In Egypt, Japan, and other oriental countries, it is used in cooking in place of lard or olive oil. As it is an excellent article for making soap, it is an important article of trade between Europe and Egypt and oriental countries. It is also used as a cosmetic and in the preparation of medicinal emulsions. The residue left after the extraction of the oil is used as a fertilizer, and also as an excellent food for fattening cattle. Of that cultivated in the archipelago but a small quantity is exported. For perfect ripening this plant requires a temperature 30 degrees centigrade and an even climate. It should be planted in places protected from strong winds, preferably on alluvial or clay soil of average fertility and capable of irrigation. The seed is sown by hand, after which the crop requires no care except thinning a little when the plants are from 12 to 16 centimeters in height. The crop is harvested when the stalks begin to fall and turn yellow. Great care must be taken in harvesting or the seed will be lost.

LUMBANG (*Aleurites triloba* Bl.).

This plant, of the family Euphorbiacæ, is cultivated for the oil which is extracted from its seeds. This oil is of good quality, is used for lighting purposes and for calking ships, and is excellent for painting. The refuse left after the extraction of the oil is generally employed as a fertilizer for the betel palms. Lumbang oil is exported to China.

CASTOR OIL (RICINO) (*Ricinus communis* L.).

This plant, a native of India, belongs to the family Euphorbiaceæ, known also as the Higuera infernal (infernal fig) and to the Tagalogs as tañgantañgan. It is cultivated for its seeds, which produce about 40 per cent of a purgative oil much used in medicine and which may be also used for lighting purposes.

A reddish oil very useful for illumination is extracted from the seeds of a tree (*Jatropha curcas*) belonging to this same family and which is known to the Tagalogs as tuba, in Iloilo as casla, and in Ilocos as tavatava.

THE PEANUT (MANI, OR CACAHUATE) (*Arachis hypogaea* L.).

This plant, belonging to the family Leguminosæ is a native of lower Guinea, from whence it was carried to Brazil, and is now cultivated in all America, the southern part of Europe, Asia, and Oceania In the Philippine Archipelago it is cultivated on a small scale only as forage for cattle.

The most important use of mani is the extraction of a fixed oil from its seeds. This oil has the important property of not becoming rancid for a long time. If the climate is suitable and the cultivation carefully carried on, the seeds will yield half of their weight in oil, but as ordinarily cultivated they do not yield more than one-third. It is a pity that in the Philippines, which has a climate so well suited to this plant, its cultivation is not more carefully and extensively carried on. The oil is fluid, yellowish in color, without odor, and with a decided sweetish taste, which makes it inferior to olive oil. It may be employed in the preparation of toilet oils, soap, and lubricating oils. The residue obtained after the extraction of the oil, mixed with an equal weight of flour, is employed for making bread. It may be mixed with cacao for the manufacture of chocolate.

CHAPTER V.

PLANTS PRODUCING DYES AND STARCHES.

In this chapter are included two groups of industrial plants—the first containing the dye plants found in the Philippines, and the second, those from which starch can be obtained.

DIVISION A.—DYE PLANTS.

Under this heading are included those plants which furnish to industry substances from which dyestuffs can be made. The cultivation of these plants has diminished greatly since the discovery of the aniline dyes which are to-day so much used.

INDIGO (AÑIL) (*Indigofera tinctoria* L.).

This plant, belonging to the family Leguminosæ, is a native of India, where it is found wild in many places and in others under cultivation. The juice extracted from its leaves and young stalks furnishes a blue dyestuff known as indigo, which is much used in the industries. The principal Philippine provinces in which it is produced are Bataàn, Batangas, Bulacan, Laguna, Pangasinan, Pampanga, Zambales, and North and South Ilocos. The latter province, even with a small crop, produces more than all the other provinces combined.

Besides the species already mentioned others are found in the Philippines, as *Indigofera trifoliata*, L.; *Indigofera trita*, L.; *Indigofera hirsuta*, L., the first two being cultivated.

Cultivation.—The indigo plant, called by the Tagalogs tayum, has small, slender, round leaves, whose tips are colored. It produces little slender pods full of seeds, by means of which it is propagated in the fields. Although this plant grows in temperate climates, two or three crops a year may be obtained in warm, moist climates as against one in the former. The most suitable grounds for the cultivation of this are those having light, deep soil, as the roots of this plant ramify but little, the central long root penetrating deeply into the soil. For this reason lands lying along rivers and small streams and at the foot of mountain ranges are most suitable for its cultivation, especially if they abound in alluvium. The land should be free from trees, so that the sun's rays are not cut off.

Under these conditions the juice of the leaves and young stems is more abundant. The soil should be deeply worked and fertilized by such substances as the residue of the indigo plant and others which contain organic matter, alkaline salts, phosphates and lime, such as refuse, ashes, etc. The seed is sown broadcast or in lines, the latter method being preferable, as it saves seed and facilitates weeding and irrigation. When the young plants are one month old the ground

should be cleared of weeds, which deprive the plants of sustenance and of light and ventilation, all of which are so necessary to them. As the coloring matter is extracted principally from the leaves, these should be collected as soon as they are completely formed and before the fruit has formed. The indigo in the leaves is without color and in solution, and forms a part of the juice. When the juice is extracted from the plant it is yellowish white in color. On being exposed to the action of the air it changes successively to yellowish green, green, greenish blue, and finally, becoming insoluble, it falls as a blue precipitate, in the bottom of the vessels in which it is contained, about thirty hours after the extraction of the juice.

Uses.--Indigo is used for dyeing thread and cloth of cotton, silk, and wool and for coloring wood paper, etc. In commerce several varieties of indigo are known, of various values. Philippine indigo is of about the same grade as that of Coromandel and Madras, which is next to that from Bengal, the most highly prized, but on account of adulterations made by speculators, principally Chinese, who mix other materials with it, Philippine indigo is somewhat discredited and has suffered depreciation in price in the markets of the world. Nevertheless, this article is regularly exported to China, Japan, and Singapore.

RATTAN (SIBUCAO) (*Cæsalpinia sappan* L.).

This is a plant of the family Leguminosæ, whose woody trunk produces a red coloring matter similar to campeachy or logwood, and which is employed in dyeing cotton or wool. It is very abundant in the forests of the Philippines, and some excellent varieties are found, which produce a color more highly valued than that of the Brazil woods. It grows naturally from the seeds which fall from the pod on the ground. Considerable amount of the dye is produced in the Philippine Archipelago, and it is an important article of export to China and England. The Chinese employ it in dyeing silks, damasks, and other fabrics woven in China. It is sometimes used in place of cochineal, though the color is not as stable.

SAFFLOWER OR ALAZOR (*Carthamnus tinctorius* L.).

This is a plant of the family Compositæ, called also bastard saffron and in the Philippines biri. It is valued and cultivated for its stamens, which contain three principal coloring matters, two yellow, soluble in water and of little value, and the third red, soluble in the alkalies and of greater importance. It is used in the adulteration of saffron.

AGUISIP (*Melastoma polyanthum* Blum.), AND BANCURO (*Morinda tinctoria* Roxb.).

These are two trees of the family of Melastomaceæ and Rubiaceæ, respectively. The natives extract from the bark of the former and the root of the latter a bright-red coloring matter which they use to dye pieces of hemp cloth, which are then called pinayusas. To obtain the coloring matter from the bancuro the bark from the upper part of the large roots is taken off, dried, and reduced to a fine powder. In this condition it is called nino or culit. The operation of dyeing these pinayusas is thus described by Father Delgado, S. J.:

The operation of dyeing these white squares on the cloth is very complicated and delicate. They are placed in little piles upon one another in a curious and admirable

manner. Each one of the little squares before being dyed is tied with a thread of hemp, each blanket or piece of cloth requiring innumerable little threads or puyos, as they are called in the native language; the little threads once tied up in this way, the dye is applied to the whole piece, a little lime is added, and after the cloth has taken the dye all the little threads are removed. As the dye has not penetrated the little squares which were tied up, these remain white, and form on the red background figures which give to the cloth the name pinayusas. The natives use this for making tents, curtains, and for adorning their houses.

BACAUAN (*Rhizophora tinctoria* L.).

Shrub or tree of the family Rhizophoraceæ. These trees make up the mangrove swamps which are commonly found along the coast and near the mouths of rivers. They have extensive and impenetrable jungles, the refuge of mosquitoes, aquatic birds, and marine animals. From the bark a reddish coloring matter is extracted. The wood is much used as firewood.

BALANTI (*Homalanthus populifolius* R. Grah.) AND CUMALON (*Diospyros cunalon* A. DC.).

These are two trees of the family of the Ebenaceæ, the bark of which when dried and reduced to a powder furnishes a black coloring matter used by the natives.

SALICSICAN (*Morinda umbellata* L.) AND OTHERS.

The salicsican is a species of nino or wild bancuro, from whose roots the natives extract a red coloring matter which they employ in various ways.

The natives extract dyes from various other species of wood. From the bark of the tree called bagolibas a dye is obtained which will give any kind of cloth a fine, tawny color. The prepared bark of the tree called dayagao makes a fine mordant, which imparts a fine luster and great stability to cloth dyed black, yellow, or red. Belolo, dugna, and hagur are very much used by fishermen for dyeing and strengthening their nets, which take on a dark brown color and are rendered less susceptible to rotting. Ananaples (*Albizzia procera* Benth.), of the family Leguminosæ, is used in dyeing hides which are to be used in the manufacture of whips, sole leather, and saddles.

DIVISION B.—PLANTS PRODUCING STARCH.

The so-called feculas, or starches, are carbohydrates which exist in plants, constituting one of the most abundant of their proximate principles. They are found in the seeds of cereals, in vegetables, in tubers, in the trunks of various palms, in the roots of some plants of the family Euphorbiaceæ, and in various organs of many other plants. According to their origin they take different names—that from wheat and other cereals is called starch; that from the potato and other tubers, fecula, which is a generic term and is usually considered synonymous with starch; that from the yucca or cassava, tapioca; and that from the palm, sago. Here will be discussed only those plants from which some one of these proximate principles is extracted. They all furnish food of great nutritive value and easy of digestion.

CASSAVA, YUCCA, OR CAMOTING CAHOY (*Jatropha manihot* L.).

This plant is an herb of the family Euphorbiaceæ, a native of tropical countries. It is notable for its roots, which contain an abundance of starchy fecula known by the name of tapioca, whose good qualities are so well known. In the Antilles, where it is known as yucca, it is cultivated with great care. The yucca or camoting cahoy, as it is called in the Philippines, grows well in both temperate and hot regions; the soil should be strong but not low, sandy and loose, so that the development of the root is not restricted; to accomplish this the ground must be plowed four or five times, finally leaving the straight parallel furrows one or two meters apart in order to allow the unrestricted growth of the plant. The plant is multiplied by means of buds growing from knots on the woody trunk, pieces of which are planted horizontally in the furrows and covered with nine or ten centimeters of earth. The roots of the camoting cahoy attain considerable size, and while they are still fresh they contain a milky juice which is poisonous, but this deleterious substance disappears upon boiling or simply upon exposure to the air for twenty-four hours, leaving the residue of the milky juice quite inoffensive.

According to Chemists Bontron and Henry, this poisonous principle is prussic acid in very small quantities, and in such a diffused state that it can not produce an instantaneous effect, but it does when concentrated. In order to utilize the root of the camoting cahoy as food it is necessary to grate it, wash it, and subject it to a considerable pressure to express the juice; the material remaining behind after these operations is the flour or tapioca. This material after being taken from the press is roasted on some hot surface, being continually stirred. The fecula or tapioca is very nutritious, some maintaining that a half a kilogram a day is sufficient for one man. It is white or yellowish white in color, sweetish in taste, and somewhat insipid. It is much valued in medicine on account of its digestibility, and it is much used as an infant food.

ARROW ROOT.

This is also called maranta, and in the Philippines tagbac-tagbac. It belongs to the family Marantaceæ, of which two species are known: *Maranta indica* L., and *M. arundinacea*, the latter a name of America and the former of India. Both are important on account of their roots, which produce the starchy feculas known as arrow root and sago. The latter is a herbaceous plant, a meter in height, having lanceolate leaves about 15 centimeters in length, similar to those of the banana plant, even in the method of growing. The part of the stalk under ground gradually diminishes in size, to the point of insertion, into a long horizontal, fleshy-white tuber, which seems to be a rhizoma, and which contains a considerable quantity of fecula.

Cultivation.—It is cultivated with success in all loose, fairly damp soils. It is planted from buds which are placed separately in holes about 60 centimeters apart, as the plant is very leafy. The crop can be collected in six or seven months without further care.

BURI (*Corypha umbraculifera* L.).

This plant is celebrated in all the Philippine Archipelago, giving name to the island of Burias, where it is found in abundance. It is found in all the other islands, although in some not in the same

abundance as others. It belongs to the palm family, grows to a considerable height, is very beautiful, the trunk being adorned with an extended bunch of leaves. These are green in color, the young ones, however, being very white. It grows spontaneously in all parts, the natives never planting or cultivating. The leaves are very large and are different from those of the cocoanut tree; they extend from a single base in the form of a fan. This plant is of the greatest value to the natives. It does not produce fruit till after many years, and when it does once produce it, it dries up and dies. The fruit grows in bunches from the top of the tree, and is filled with little round nuts like hazelnuts. The fruit, however, is not edible.

Use and Method of preparation.—To obtain the starch, the tree is cut down at the root and all of the soft interior part of the trunk is taken out and placed while moist in casks or troughs, while some of the naturally bitter substances are drained from it; it is now pounded with sticks or mallets, when the starch separates in the form of very fine grains; it is then collected and dried and made into flour, which serves as food for the natives, and some of which is sold in Manila and other parts. It furnishes an excellent, tasteful, and good food, which is called in commerce sago. In Burias, Masbate, Bohol, and other parts where the tree grows in abundance, it takes the place of rice as a food stuff.

BAGSANG (*Metroxylon rumphii* Mart.).

This palm, called Bagsang, is very common in the Visayan Islands and very useful to the inhabitants. They neither plant it nor cultivate it, as it grows spontaneously from the seeds which it produces or from the shoots which grow at its base. It generally grows along the banks of rivers and estuaries, in moist regions, and in places near springs. This plant has many uses in all times, but especially if there is a lack of rice or other food stuffs. To obtain it, the tree is cut down and stripped of its bark, which is called baje, and which is utilized by the natives in many ways. The interior or heart of the tree is then cut into strips, which are dried over a fire and saved for further use. It is then pounded in wooden mortars, being reduced to a sort of flour, which is of great nutritive value. It is most frequently made into cakes or fritters, which, when eaten with cocoanut milk, are very good and healthful.

LUMBIA, OR LUMBAY (*Metroylon silvestre* Mart.).

This is a palm very similar to the preceding one, but taller and larger and having wider and stronger leaves. It grows along the shore of the sea and along the banks of rivers and creeks and in other places where water is abundant. It grows from its small fruit, which is not edible. A species of flour is obtained from the heart of this palm, which serves as a food stuff to the poorer classes, especially during times of famine.

CAUONG (*Caryota onusta* Bl.).

This is a palm similar to the preceding, from whose trunk a species of sago is obtained. The method of extraction is that generally pursued. The tree is cut down and the fibrous material removed from

the interior. This is pounded and then soaked in a cask, when a fine white flour settles to the bottom. The water is poured off, the precipitate remaining behind being a sort of sago.

PAGAHAN, OR BANGA (*Caryota urens* L.).

This palm, although containing a poisonous substance, furnishes a starch, or kind of sago, of excellent qualities and in good quantities. It is prepared according to the methods already described.

CHAPTER VI.

PLANTS PRODUCING SACCHARINE AND ALCOHOLIC SUBSTANCES.

Two groups of plants are included in this chapter, the saccharine plants, or those which produce sugar and alcohol, and those from which alcoholic drinks are made. Only the species of both groups cultivated in the Philippines will be mentioned.

SACHARINE PLANTS.

SUGAR CANE (*Saccharum officinarum* L.).

This plant, known by the name of sugar cane or honey cane, belongs to the family of grasses. It is a native of India and China. In the Philippines it is one of the agricultural products of greatest importance. The sugar-producing provinces are Pampanga and the island of Negros, and on a smaller scale the Laguna Bataan, Batangas, Iloilo, Cebú, Cavite, Pangasinan, Capiz, Antique, and Mindanao. There are many varieties of sugar cane, there being no less than twenty in the Philippines. The most important one cultivated, besides the ordinary variety, being the Batavian, which is distinguished from the common variety by the violet color of its stalks and the larger number of joints and its greater size; the Otaheite, which is taller and larger than the previous one, and has a lemon-yellow stalk; finally the yellow or creole variety, which has a slender stalk, and is yellowish white in color.

Cultivation.—This plant for its full development requires a climate whose temperature is not less than 18° C., and which should be as high as 23° C. during the ripening period. The soil should be deep and of medium consistency and, preferably, clayey loam or silicious. The best fertilizers are manure, ashes, blood from the slaughterhouses, lime, and green stuff; fish, on account of the phosphorus which they contain; sulphates and phosphates of potassium, and, better than all of these, the bagasse, or the refuse left after grinding the cane. The ground should be prepared by plowing three or four times, and finally by hoeing, leaving it perfectly soft and smooth. Little holes of varying depths are then made in the soil at a distance of a meter or a meter and a half from each other. In these are placed little pieces of the stalk, some 40 centimeters long, each one of which should contain eyes or buds. These should be placed in water twenty-four hours before planting. They are then placed four or five in a hole, somewhat inclined, and are covered with 4 or 5 centimeters of soil, and worked if necessary. Other care of the crop is reduced to irrigation, hilling, and necessary weeding. The cutting begins when the cane assumes a yellow color on the lower part of the stalk and

when the juice shows 8° or 9° on the Baumé scale. The cane should be cut obliquely and when the earth is not too moist, as when there is an excess of moisture the blow of the machete or knife breaks the root and thus injures the plant. In the Philippines the cultivation of sugar cane is generally carried on with little care and intelligence, and this is one of the reasons why the quantity and quality of the crop has diminished. To increase the production, it will be necessary to perfect methods of cultivation, selecting the best varieties of cane, or those which are best suited for the existing conditions, and tilling and fertilizing the land with more care; so, too, much greater care should be taken in the manufacture of the sugar.

SORGHUM (*Sorghum saccharatum* Pers., or *Saccharum koenigii* Retz).

This plant likewise belongs to the family of grasses, and in its stalks are sweet juices which sometimes give as high as 17 per cent of prismatic sugar. In the Philippines this plant is utilized only for forage, although it might well be cultivated for the production of sugar in certain regions where sugar cane does not grow well. Sorghum demands the same kind of soil and the same cultivation as corn. It is planted in the same manner and should be weeded and hilled in the same way as corn. Alcohol for industrial purposes can be obtained from sorghum as well as from sugar cane.

ALCOHOLIC PLANTS.

Under this heading will be included such vegetables as contain glucose or other substances which can by means of fermentation be converted into alcohol or alcoholic drinks. In the Philippines these plants are nipa, cocoanut, buri, cauong, pugahan, maize, and others.

NIPA, OR SASA (*Nipa littoralis* Bl., *Nipa fructificans* Thunb.).

The nipa is a palm which grows to a height of 4 meters, and from whose short stem rise large leaves composed of a multitude of little ensiform leaflets. The fruit consists of various clusters lying very closely together, although they are easily separated, which together form a large bunch hanging at the end of a thick peduncle which arises from the base of the tree. It is indigenous to the coast and grows only in muddy regions, or those which are liable to be overflowed, or the mouths of rivers which communicate with the sea. It is one of the most useful trees found in the Philippines. As a thatch it covers a great majority of the houses and even some of the churches in the islands. Many of the native houses have the walls and partitions made of nipa, as well as the roofs; but of still greater importance than the leaf is the tuba or sap from which nipa wine or arac (arrack) is made and which is consumed to such a great extent by the natives.

Cultivation.—Nipa groves must be prepared by planting, which usually takes place between May and the last of July. The ripe fruits which fall to the ground are collected and employed for this purpose. Two or three of these fruits are placed in holes which are located about 1.7 meters from each other. As the rains are very frequent during these months and the ground is kept moist it is not usually necessary to irrigate. This condition of moisture of the ground is also favored by the high tides. In order to get the best results from the grove all

NIPA (IN TRANSIT).

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dead leaves, or those which could prejudice the development of the fruit, should be removed.

Method of obtaining the tuba.—A grove becomes serviceable at the end of five or six years. In order to obtain the tuba an incision is made in the peduncle immediately below the point of insertion of the fruit, leaving a few of the best developed fruits for purposes of reproduction. A liquid which flows from the incision is collected in bamboo tubes or joints called bombones, which are hung conveniently on the plant. In order that this sap shall flow with the greatest facility several little operations are gone through with. The first of these, called sicat, consists in striking the peduncle of the fruit several blows, with the object of loosening somewhat the tissues and opening the pores. This operation should be done once a week during the five months preceding the producing season. Simultaneously the process called talog, which consists in cleaning the peduncle of all leaves, is gone through with. When the collecting season arrives the operation called pucao is gone through with. This consists in rapidly rubbing the foot against the peduncle so as to call the sap toward the fruit. After this comes patit, which consists in cutting the peduncle near the base and leaving the bamboo joint attached, in which the juice is collected as it falls drop by drop. After this the incision on the peduncle is renewed twice each day, morning and evening, the tuba being collected daily. The collecting season lasts about ten months, the production increasing gradually for the first five months and decreasing slowly from that time. The average production of a single plant is about 46 liters during the season. When the business is carried on on a large scale one-half the product goes to the owner and the other half to the workmen. The tuba is afterwards distilled and then concentrated in stills, and although the loss of liquid is great, there still remains a considerable amount. This tuba, when much fermented, may be used as vinegar. One hundred jars of this vinegar, each containing 48 liters, sells for $10 or $12.

THE COCOANUT (*Cocos nucifera*, L.).

Method of gathering the tuba.—To obtain the tuba from the cocoanut tree the same is cut before the flower is formed and before it has appeared externally. A bamboo joint or bombone is then attached for the collection of the liquid. The flower cluster or summit is bound together with pieces of rattan so that the bamboo joint can be easily adjusted. As one tree may have several flower clusters, as many bamboo joints as are necessary are placed in position. A little of the powdered bark of the tongog (*Rizophora longissima*, Bl.) is placed in each bamboo joint; this serves to give strength and a reddish color to the wine. The wine is collected daily by men who carry large bamboo joints hanging over the back and held in place by a curved piece of wood. Attached to this large bombone, which is carried on the shoulder of the workman, is a rounded receptacle made of a shell of a cocoanut, which contains the powder already spoken of. Every time one of the small bamboo joints is emptied it is necessary to clean it perfectly on the inside and to renew the powder. This cleaning is done by a little brush or broom, which is made of a piece of the stem of the leaf of the cocoanut tree, which is carefully pounded on the end so as to convert it into a shorter brush. A small quantity of powder is then placed in the bombone and a fresh incision made in the flower stem.

This cutting of the flower stem is done with a very sharp little curved knife. Each stem will produce wine for a period of two months, after which it dries out. In order to facilitate climbing the trees notches are made on either side, thus forming a sort of ladder. When a collection of tuba is carried on on a large scale, in order to avoid the loss of time involved in climbing each tree, large bamboos are tied from one tree to another horizontally, the two passing from tree to tree; one of these serves as a foot bridge and the other as a hand rail. Men frequently fall from them, often with fatal results. This tuba begins to ferment within an hour, more or less, after its collection, and at the end of a day it has changed to a sort of vinegar, fermentation often being facilitated by the addition of suitable plants. The liquid is then distilled, the distillate being known as cocoanut wine.

BURI (*Corypha umbraculifera* L.).

This plant also produces a wine called tuba. It is obtained from an incision in the fruit, from which the juice issues. From this juice wine is made, and also a yellow honey-like substance called pacascas.

CAUONG (*Caryota onusta*, Bl.) AND PUGAHAN (*Caryota urens* L.).

A sweet liquid or tuba is obtained in the same manner in the fruit of these plants.

There are also other plants of less importance from which the natives obtain their favorite drink, tuba.

MAIZE OR INDIAN CORN, ETC. (*Zea mays* L.).

An alcoholic drink, called in the Visayan Islands pangasi, is obtained by the fermentation of the starch of corn. Several families generally unite to make this drink and they generally end up by becoming very joyful and noisy.

CHAPTER VII.

AROMATIC PLANTS.

TOBACCO (*Nicotiana tabacum* L.).

Tobacco is a plant belonging to the family Solanaceæ, having straight cylindrical stems, wide soft leaves of a dark-green color, whitish-green funnel-shaped flowers, and numerous seeds contained in the two sides of a pod or capsule. It is an annual plant in Europe and evergreen in South American and other parts.

This plant is a native of America. It was introduced into the Philippines by missionaries in the last quarter of the sixteenth century by means of seeds coming from Mexico. Its cultivation spread rapidly on account of the favorable conditions of climate and soil, and the favor with which the natives looked upon it. From the Philippines it was introduced into the south of China.

Species and varieties.—The genus includes a large number of species and varieties widely distributed over all parts of the world. In its properties and uses it differs but little. The principal species and varieties are:

First, common tobacco (*Nicotiana tabacum* L.), called also tabaco macho, or male tobacco, which is the best of all. It is somewhat gelatinous or viscid. Its stalks reach a height of 1 meter, its leaves are oval or heart shaped, and its flowers purple.

Second, tobacco hembra (female), or Mexican tobacco (*Nicotiana rustica* L.), which has rounded leaves, and which is cultivated with good results in the south of France.

Third, verina, or Brazilian tobacco (*Nicotiana paniculata* L.). This is a small species, very mild, demanding a very warm climate. It is much used in Turkey.

The principal varieties of the first species are the Virginia tobacco, which has sharp leaves and does not require an especially fertile soil, and which loses but little in drying; Carolina tobacco, with shorter and narrower leaves than the Virginia tobacco and likewise less delicate in its growth. Tobacco growers, paying little attention to the botanical and scientific classification and more to the form and utility of the plant, divide it into two classes, wide leafed and narrow leafed. The qualities determining the price of tobacco in the market are combustibility, strength, aroma, fineness, elasticity, color, and uniformity. Philippine tobacco, which up to a short time ago was considered second best in the world, on account of its agreeable aroma, fine veins, and notable elasticity, has recently lost much of its reputation. Tobacco coming from the province of Isabela de Cagayan is considered the best in the Philippines. That from the Visayan Islands is coarser, more unequal in color, and of greater strength. The tobacco from Nueva Ecija is fine, but somewhat bitter in taste and yellow in color. That from Union, Ilocos, and the Igorrotes is of heavy body, broken, and frequently has but little combustibility.

Philippine tobacco may be divided into two groups: First, the varieties with elliptical or ovate, wide, or heart-shaped leaves, which is called in the provinces "tobacco from the old seed;" and, second, tobacco with lanceolate, narrower leaves than the preceding, which is generally known under the name of "tobacco from new seed." The former comes from Mexico, and the latter is supposed to have been introduced recently from the United States.

Cultivation.—Although tobacco grows in almost all climates, the product is more abundant and much better when grown in hot climates, as the heat has a great influence in determining that important quality, the aroma, which it is impossible to impart artificially. The lands most suitable for its cultivation are those of medium consistency and depth, which are cooled during the summer time, or such as have a sandy or silicious subsoil covered with loam, which are situated along the banks of rivers which are periodically overflowed, thus adding new mineral and organic constituents to the soil. These lands are called vegas (meadows), and in this country the name of vegueros is given to the workmen on such plantation. As the tobacco plant is very delicate, it is necessary to fertilize the soil thoroughly. Among fertilizers may be mentioned those which contain potassium, lime, chloride, and phosphate, the best being manure in an advanced stage of decomposition. The preparation of the soil, which should be very deep and carefully done, consists of three plowings at intervals of several days, and the completion of the process by grading and leveling and the removal of all injurious weeds.

The tobacco seed is sown in hotbeds, which are made on level, clean ground, having a carefully fertilized soil. The seed is selected from accredited sources and sown broadcast, being mixed with fine sand. These beds are about a yard wide, space enough being left between them to allow of the passage of weeders and other workmen. The seeds are covered lightly with earth, which is packed down a little and then irrigated, this operation being frequently repeated until the plants appear. These beds should be fenced in and covered over with branches, so as to protect the plants from the direct rays of the sun, but not interfere with ventilation. When the plants have four leaves this cover is removed, so that they may develop with greater vigor, and transplanting immediately begins. The plants are separated a distance of about 60 centimeters from each other. When the flowers begin to appear and 10 or 12 leaves have developed, the buds are cut from the extremities of the stalks, so that the sap may flow to the leaves and nourish them with greater vigor.

The gathering of the leaf is begun when the plant is in just the right condition, and the recognition of this is of the greatest importance for the quality of the tobacco. At this time the leaves begin to turn yellowish, wrinkle somewhat, droop, and show more or less of a sticky juice, according to the abundance or scarcity of rain during this period of ripening. This condition having been reached, the process of gathering begins. This may be done either by cutting off the stalk at the base, which is not a good way, or by collecting the leaves, one at a time, in the order in which they grow; or, beginning below, gathering a handful of two or three at a time. They are then classified according to size and quality, being left on the ground until they have dried. The tobacco is then tied in bundles, which are suspended by cords in the tobacco storehouse. They are thus protected from the

PLANTATION OF TOBACCO, AND FIELD HANDS.

sun, but are exposed to excellent ventilation on all sides by windows and doors, which are opened or closed, according to circumstances.

Diseases.—The tobacco plant is subject to injury from various kinds of insects which attack it. Among these the most dreaded is that called cogollero. This is a white butterfly, which is so called because it grows and develops in vegetables, such as cabbage and lettuce. The gordo is a large black worm which eats the stems of the leaves, cutting them and causing them to fall. The cachasado is the larva of *Hadena androgea* Lat., which lives and hides during the day in the roots of the plant. The primavera is very voracious, and the babosa and other small animals not so much dreaded.

Chemical composition.—The chemical composition of tobacco is very complex and variable, according to the kind and origin of the sample under examination. Vauquelin and other chemists who have analyzed it have found inorganic substances, such as silica, potassium, magnesia, ammonia, nitric acid, hydrochloric, phosphoric, and sulphuric acids; neutral organic substances, such as cellulose, oil, yellow and green resins, and a volatile alkaloid called nicotine. This is an oily, colorless substance of pungent taste and odor, soluble in water, alcohol, and ether. This alkaloid is found from 1½ to 9 per cent, according to the kind of the tobacco, and it is worthy of note that the best tobaccos, and those having the greatest reputation, are those which contain the smallest quantity of nicotine. Dr. Lebon, of Paris, has recently announced the presence of a new alkaloid in tobacco—colidine—which is as poisonous as nicotine. Nicotine is very energetic, and in a short time poisons small animals, but is much less active in the plant itself, as it is mixed with other less active and inert substances.

COFFEE (*Coffea arabica* L.).

Coffee is a plant of great importance in the Philippines. It belongs to the family Rubiaceæ, is a bush 2 or 3 meters high, having permanent leaves and white, fragrant flowers like jessamine in appearance, which have five stamens grouped together near the base of the leaves. The fruit is an oval fleshy berry, somewhat resembling a cherry, having a clear, green color, which changes to intense red when the fruit ripens.

History.—This valuable fruit is a native of ancient Ethiopia, obtaining its name from the region called Kaffa, where it grows in great abundance. It was brought to the Philippine Archipelago by the Spanish missionaries toward the end of the last century, where it was first cultivated in the province of Laguna. It was afterwards naturally propagated easily and rapidly by a little mammal (*Paradoxurus musanga* L.), which fed upon the berries. Afterwards its cultivation fell to the lowest ebb in spite of premiums offered to cultivators. At the present time, due to the increased price of coffee and better facilities for exporting, its production has begun to increase.

Species and varieties cultivated.—Although there are many different species of the genus *Coffea*, but four constitute the coffee of commerce. They are: *Coffea arabica*, or common coffee; *Coffea racemosa*, or Peruvian coffee, very similar to the preceding; *Coffea laurina*, or African coffee, and *Coffea liberica*, or Liberian coffee, a more robust plant, which has larger leaves than the common coffee plant. Almost all of the varieties cultivated come from the first species, which is the one

requiring most heat. In the Philippines the provinces producing most coffee are Batangas, Laguna, Tayabas, and Cavite in Luzon and the districts of Cotabato and Misamis in Mindanao.

Cultivation.—Coffee requires a climate whose average temperature ranges between 16° and 24° C., and, therefore, next to sugar cane, is the plant requiring the greatest amount of heat. In localities having both heat and moisture its growth is stronger and more luxuriant, as is manifested in various ways. In very hot climates the coffee plant grows well, but should have the shade of some other suitable tree, whereas in cooler climates it thrives best without this protection. The soil most suitable for its cultivation is that which is light and moist, but not marshy. Reddish soils somewhat sandy, or black soils without too much clay, are suitable for its cultivation.

If the land is virgin soil it should be thoroughly cleared, plowed deeply two or three times, and then harrowed, and if old land, it should be well fertilized.

Planting can be carried on in various ways; the best are by means of hot beds and by transplanting. These hot beds or nurseries are made in well-shaded soil, which should be clean, well worked, and thoroughly fertilized. The seed should be ripe and fresh, and not taken from the fleshy covering. Transplanting is done when the plants have three or four roots, care being taken not to injure the delicate stem, although a part of the central root is cut off at the moment of transplanting. Plants which have reached a height of 40 or 50 centimeters may be used by cutting off the upper part of the stem and likewise the vertical root, stamping down the earth about them, and immediately watering. The ground where this transplanting is made should be previously prepared, holes being made in parallel lines running north and south, and having a distance of 2½ meters from each other. The land should afterwards be kept clean and other trees should be planted for their shade. The tree usually employed in the Philippines for this purpose is called madre cacao (*Galedupa pungam* Bl.), but there are many who advocate the use of the balibago (*Hibiscus tiliaceus* L.) as giving better protection to the plantations and being more productive. Experience demonstrates that the pruning of coffee trees prejudices the production, as the plant growing naturally with favorable rains produces at the end of six or seven years an average of 5 kilograms of berries for each one, while those which have been pruned do not produce one-fourth as much.

The gathering is accomplished either by shaking, if the plants are high, or by hand picking if they are low. After gathering the pericarpium is removed, an operation easily accomplished by hand, and the berries are placed in the sun, care being taken to separate those collected on various days. When the berries are thoroughly dried, the husk is removed by means of a mill or other apparatus. The other operations necessary to prepare coffee for the market are winnowing, to separate the inner husk and all dirt from the berry, and sorting into first and second grades.

The coffee plant begins to produce in from three to five years, according to climate, soil, and cultivation, is in full bearing in six or seven years, and continues to be productive for thirty years if no accident happens. Philippine coffee compares well with that of Java or Martinique, but there are certain localities which produce coffee which, according to experts, can be compared only to that of Mocha.

From former times the production of coffee in the Philippines has fallen off greatly on account of the destruction of the plants by an insect of the genus *Xylotrechus* and by a fungus of the genus *Peronospora*.

CHOCOLATE (*Theobroma cacao* L.).

Cacao or chocolate belongs to the family Sterculiaceæ, and is a native of Mexico and South America. It is a tree which is distinguished for its beautiful appearance, but more for its fruit, which is very highly prized, as is shown in its botanical name *Theobroma* (food for the gods). The seed of this fruit properly roasted gives out a delightful aroma, and well ground and mixed with sugar and a little cinnamon it forms chocolate, a nutritive, healthful, and agreeable food. It was introduced in the Philippine Archipelago from America some time between the years 1660 and 1670. Although it has been cultivated for a long time in small quantities in various provinces of Luzon and Visayas, it flourishes best in southern Mindanao, and in the district of Davao it is produced in large quantities and of excellent quality.

The tree reaches a height of from 8 to 11 meters and has straight branches. The petiolate leaves, oblong or ovate-oblong, are acuminate, strong, and smooth, and of same color on both sides. The small flowers are reddish in color and very numerous. The fruit is reddish or yellowish, ovate or oblong, having ten ridges, and simulates to a certain degree the shape of a small cucumber. The seeds are somewhat larger than an almond.

Cultivation.—This plant demands a warm climate having an average temperature of from 23° to 29° C. and a considerable amount of moisture in the atmosphere. The soil should be deep and light. Black and reddish soils, somewhat sandy, with an abundant top soil of muck, are excellent.

Planting can be done from the seed, and to save time this is usually done by planting the seed a distance of from 2½ to 3 meters from each other in parallel lines. In the Philippines the seed is often planted in bamboo joints or in the forest, from whence they are transplanted to ground shaded by banana plants. As the chocolate plant requires shade, the tree called madre cacao is usually planted. This plant requires much more care than the coffee plant. In its cultivation it is necessary to remove all premature flowers, trim off dry branches, and keep the ground well cleaned.

The fruit is gathered when it becomes ripe. The life of the chocolate tree is supposed to be about thirty years, during which time it produces fruit. It may live to be 50 years old or more, but is almost unproductive.

NUTMEG (*Myristica fragrans* Houtt.).

The nutmeg grows naturally in Cebu and in Laguna province, and will grow in all parts of the islands cultivated. It is a tree belonging to the family Myristicaceæ. In the Dutch possessions the tree reaches a height of from 10 to 13 meters. The trunk is covered with rather thin bark, blackish and slightly mottled, from which, when incised, flows a reddish juice which coagulates on contact with the air. The fruit is about the size of a small peach, having a thick husk and a hard pit about the size of an almond, inside of which the nutmeg is formed. This is surrounded by an aromatic rind, or skin, called mace. The

beautiful flower of this tree is aromatic, and from it a kind of preserve, noted for its fragrant odor, is made.

The tree begins to produce at the age of 5 or 6 years, but the crop is very light at first.

CINNAMON (*Cinnamomum burmanni* Blume; *Laurus cinnamomum* Blanco).

The cinnamon tree is found in these islands, especially in Mindanao. In Zamboanga, Caraga, and in the mountains of the district of Misamis varieties of cinnamon of stronger taste and fragrance than those of Ceylon are found. The reason it is not more exploited is because it seems to contain some kind of bitter principle, which is noticed when it is chewed. This tree should be more highly prized in these islands, as it grows wherever it is planted. The cinnamon comes from the bark of the branches which have been stripped of their epidermis, and is an aromatic substance, having many uses.

PEPPER (*Piper nigrum*, L.).

This plant belongs to the family Piperaceæ. Its cultivation diminishes daily in the Philippine Islands. It is a climbing plant, which is fastened to adjacent trees when cultivated. Its fruit is a berry which, when dried, is black or white pepper. In the northern part of the islands the long pepper of British India can be cultivated.

BETEL OR ITMO (*Piper betel*, L.); BUYO DE ANIS (*Piper anisorum*, Bl.).

The betel or itmo is a climbing plant, belonging to the same family as the preceding. It is cultivated very extensively throughout India, the Sunda Archipelago, all the regions adjacent to Asia, and the Philippines. In all of these countries the leaves are used in making the preparation which is known in the Philippines as "buyo." This preparation is composed of one of the leaves of this plant, a piece of lime the size of a pea, and a piece of bonga or betelnut. The object of this mixture is to mollify and render supportable the taste of the pepper leaf, which otherwise would be acrid and disagreeable.

The buyo de anis has a leaf which has an agreeable odor resembling anise. This leaf is used by some natives to mix with the pepper leaf in the preparation of buyo.

CHAPTER VIII.

MEDICINAL PLANTS.

PLANTS USED FOR DISEASES OF THE HEAD.

The castor-oil plant (*Ricinus communis* L.), of the family Euphorbiaceæ, which is called "tangan-tangan," is very abundant in these islands. It is used principally to alleviate headaches, being applied on leaves to the forehead, causing sweating and, consequently, relief. Mixed with the oil of sesame it is applied to the stomach with good effect; so, too, it is applied to the feet of persons suffering with dropsy.

Balocanad (*Aleurites trisperma* Bl.) belongs to the family Euphorbiaceæ. It has a fruit a little larger than the pomegranate. This fruit contains six or seven poisonous seeds. The oil of these seeds when rubbed into the scalp kills all vermin.

The leaves of the capanatolet or gaudarura, when properly applied, improves and cures those who suffer with pains in the back.

The so-called dacdac has medicinal properties. Its stalk or stem is about the size of the index finger, somewhat flattened, and blackish in color. An infusion is made from this stalk chopped up finely. When the head is bathed with this infusion, headaches disappear, as does the lethargy from which the patient suffers. This is true when it is used in the treatment of any other cephalic disease.

PLANTS USED FOR THE DIGESTIVE APPARATUS.

The salibutbut or pandacaqui (*Tabernæ montana*) belongs to the family Apocynaceæ. An infusion of the root of this tree when given as a drink improves the stomach and bowels in cases of distention, cold, and indigestion. It is likewise an excellent blood medicine, and is used with great benefit by women after parturition.

The leaves of the taguypasin or alom are of value in any chronic stomach disease due to inflammation, overloading, or cold. They should be applied hot or united with oil used as an unguent. They are of great value in reducing inflammation or swelling of the limbs if used in the same way. They cause sweating, after which the limbs should be enveloped in a blanket, dried, and the operation repeated if complete relief is desired.

The leaves of the maisipaisi (*Clausena* sp. Bun.), of the family Rutaceæ, have an odor and flavor very similar to that of anise. From these leaves an oil of anise is made, which is very useful for diseases of the stomach. Made as an infusion with cocoanut wine, it furnishes a drink much used in the country.

The tree known by the name of "bacao" furnishes a bark which, when pulverized and mixed with water, furnishes a remedy which kills all kinds of intestinal parasites. This same property is possessed by

the fruit of a trailing plant called "tangulon," "piñoncillo," or "niog-niogan" (*Quisqualis indica* L.) of the family Combretaceæ.

The tree called "bahay" (*Adenanthera pavonina* L.) produces a fruit something like ordinary beans in appearance, but of a bright red color. These placed in cavities of teeth greatly relieve the pain, the same object being accomplished by the root.

The grated bark of the maragaat (*Ficus radiata* Dec.), of the family Urticaceæ, when applied to the gums reduces swelling and strengthens the teeth.

The paetan (*Lunasia parvifolia* Muell.), of the family Rutaceæ, is an antidote for fish poison. Taken as a powder, it cures any stomach disorder and is an excellent remedy for ulcerating sores, which it cleans and closes.

The sambong (*Blumea balsamifera* DC.), of the family Composita, is an excellent sage, quite aromatic, and having medicinal properties. As an infusion it is much used in diseases of the stomach.

The tangulon (*Quisqualis indicus* L.), of the family Combretaceæ, is another species of trailing plant, which grows bountifully along the seashore, produces a seed called "piñoncillo," which is an excellent vermifuge. It may be eaten raw without danger of injury.

The cabcaban (*Polypodium quercinum*, L.) and the balsamina or apalia (*Momordica balsamina* L.) produce purgative medicines.

PLANTS USED FOR THE CIRCULATORY APPARATUS.

The sibucao or Brazil wood (*Cæsalpinia sappan* L.), of the family Leguminosæ, is medicinal. An infusion of it causes the absorption of coagulated blood, and it is given in cases where blows on the body have caused the extravasation of blood into the tissues.

The cumalibquib or himangcoran or otob-otob are medicinal. The grated root made into an infusion cleans and cures ulcers or wounds. An ointment is made from this plant and from the jalanotan and hagonoy. This is made by boiling the plant in oil, straining, and adding a little wax. The ointment may then be used for the cure of wounds. So, too, the leaves of a climbing plant grown in the Visayan Islands, and which is called "balangon," is useful for this purpose. The pounded leaves are applied directly to the wound.

PLANTS USED FOR AFFECTIONS OF THE SENSES.

The tuyucay is used as a remedy for deafness. In the operation a branch 8 or 10 inches in length is placed over a slow fire until it becomes quite hot. It is then placed close to the affected ear and air is blown through the hole which passes through it, care being taken to keep the branch well within the ear. It is claimed that the hot tube has some special virtue, due perhaps to the medicated moisture thereof; when penetrating the ear restores it to a healthy condition.

The tree called "haulig" is very useful for treating and preserving the eyes, a solution in water of the bark and leaves being used as a wash.

PLANTS USED FOR THE SKIN.

The resin of culasi (*Lumnitzera coccinea* Wight and Arn.), of the family Combretaceæ, cures scab and itch.

A resin which serves well as a caustic is obtained from the canumay and the lagnoto (*Diospyros multiflora* Bl.)

The tree called panjantolon (*Scaevola koenigii* Vahl.), of the family Goodenoviaceæ, an extraordinary large tree, is useful in medicine. An infusion is made from the leaves and bark which is used as a lotion for those suffering with specific trouble. This cures the disease and relieves the pain in the bones which accompanies this terrible disease.

The pila and the root of the trailing plant called mangadlao are both useful in treating all kinds of wounds.

All kinds of spots on the skin are cured by a lotion made from the roots of the tree called salac.

A lotion made from the wood of the mampol, of the genus Loranthus of the family Lorantaceæ, will cause the pustules of smallpox to appear when they are slow in presenting themselves.

The leaves of the little tree called alocloc when crushed and applied to boils or other cutaneous tumors quickly brings them to a head and causes the removal of their contents.

Sarsaparilla of the genus Simlax, called by the natives banag, is very common along the banks of the rivers and the coast. The root is used in medicine and is well known as a remedy for those who suffer from specific ulcers. It is given as an infusion.

The trailing plant called bago-bago, of the genus Garcinia, family Guttiferæ, is also used. It is powdered, and placed over the fire, and applied hot to patients suffering from inflammation, as it quiets the nerves and relieves the pain in the joints.

The plant called busalas is likewise medicinal. Its leaves, when reduced to ashes and mixed with a little oil, will bring to a head any kind of an abscess, or, if these are already in the stage of suppuration, it will cause them to open and will cure them without trouble.

PLANTS USED IN PARTURITION.

An infusion of the leaves of the taraje (*Casuarina equisetifolia* Forst.), of the family Casurinaceæ, will cure chlorosis.

The leaves of the alagtayo or ticala, when applied to abdomen of a pregnant woman, will very quickly bring on parturition.

PLANTS USED AS ANTIDOTES.

According to the opinion of experts the manungal (*Samadera indica* Gaert.), of the family Simarubaceæ, is one of the best antidotes found in these islands. A solution made by boiling is given to anyone who has eaten poisoned substances, such as herbs or fish. The oil of manungal is admirable for curing all kinds of disorders of the stomach, as is likewise the infusion made from marbar or cayutana.

An infusion of the bark of the palagnigon is both an antidote and a febrifuge.

An infusion of the bark of the calasusi (*Plumeria acutifolia* Poir.), of the family Apocynaceæ, is an excellent mild purgative, or may be used as an emetic.

The bark of the root of the tree called bagosabac is curative for the bite of any kind of poisonous animal or snake.

PLANTS USED AS FEBRIFUGES.

The tree called tambalaguisa or mantala (*Sophora tomentosa* L.), of the family Leguminosæ, has at a certain season a number of little yellow flowers, and following them, long pods filled with seeds, somewhat like chickpeas. This fruit is a febrifuge having a very bitter taste. One or two of the seeds are given to those who suffer from certain malarial fever. The medicine is still more valuable for those having quartan. It is likewise an excellent stomachic. From these seeds an oil is also made which gives great relief to pains in the bones. It is also used for intestinal troubles and is a remedy for chlorosis. Another trailing plant having admirable qualities is called by the Tagalogs macabuhay and by the Visayans pangianan (*Menispermum rimosum* L.). It belongs to the family Menispermaceæ. It is very bitter and very useful for the stomach and the entire body.

The bark of the tree called dita (*Alstonia scholaris* D. C.), of the family Apocynaceæ, when treated with acidulated water, produces an alkaloid, ditain, which is employed in place of quinine for all kinds of fevers.

PLANTS USED AS DIURETICS.

An infusion of the leaves of the tree called polotan or uliñgon serves as an excellent diuretic. The juice of the bark or an infusion of it is likewise useful.

The palo-santo, called by the natives guicos-guicos, or hannadao, of the genus Abrus, family Leguminosæ, possesses admirable properties. It is an excellent remedy for spasms and chills, from which so many suffer in these countries. An infusion of this plant expels injurious humors from the body, does away with obstructions, regulates the stomach, and is of equal value with sarsaparilla for specific trouble. It is likewise a sudorific.

Naguini and languingi are trailing plants which cure muscular and nervous spasms, the leaves being applied as a plaster after being heated before the fire. The application is made under the arms.

PLANTS USED FOR VARIOUS MEDICINAL PURPOSES.

The pilipog is a most bitter medicine. It is useful as a stomachic, and simply chewed and swallowed serves to cure any kind of pain. It is likewise an antidote, and in the form of an infusion is a febrifuge useful in tertian and quartan fevers.

Among all the trailing plants found in these islands that which is of greatest importance and most esteemed is called by the natives igasud, (*Strychnos ignatii* Berg.) of the family Loganiaceae. The Spaniards taking up the name which was given to it by the missionaries in the Visayan Islands, call it the pepita of San Ignacio. It abounds in all the mountain regions of Visayas, but is not found in Luzon. When full grown it is of considerable size, the fruit at times being as large as a pomegranate, though a little longer. It has a hard shell, within which is a yellowish or slightly reddish meat, and in this is found the seed so highly esteemed in all parts of the world. These seeds are grown principally near Catbalogan. They are used for persons who have eaten something poisonous, in which case a little piece is eaten and immediately followed by a drink of cold water, the poison thus being expelled. So,

too, taking it in this manner it cures disturbances of the stomach or intestines. It is likewise useful for paralytics and for women during parturition. Grated or in the form of powder it is much used as styptic. Grated and given with water at the beginning of the chilly stage will often prevent an attack of malarial fever. It is also useful for the bite of the caterpillar called basut, when applied as a powder over the affected place. It is used also as an emetic. Held in the mouth and sucked it is useful for rheumatism. So, too, it relieves indigestion. The oil remaining after pieces of this seed have been fried is useful for contractions of the nerves and pains in the body.

There are many other medicinal plants in the Philippines, as may be seen by consulting the General History by P. Juan J. Delgado, S. J., published in Manila in 1892, and others.

CHAPTER IX.

FRUIT TREES.

Philippine fruit trees in general do not produce such exquisite and highly-prized fruits as do those of Europe. As both wild fruit trees and cultivated ones are very abundant, only the best-known ones will be spoken of; some mention will be made of their probable origin, arranging them according to the families to which they belong.

ANACARDIACEÆ.

Among the Philippine species of this family is the mango (*Mangifera indica* Linn.), which is believed to come from Macao, and which grows well in the provinces of Manila and Cavite, and also in the Visayas. The fruit season begins in April. The fruit has a delicate flavor and an aromatic odor, the largest of them being from 6 to 7 inches in length; in shape they are flattened, not round; the skin is yellow and rather fine; the pit, which lies in the center of the fruit, is almost as long as the fruit itself, but very narrow. The plant springs from this seed. The leaves are long and wide and dark green in color; an infusion of these is somewhat similar to tea. Besides this species the following are found: Manga de anis (*Mangifera fragans* Maingay) and mani (*M. cosia* Jack), which is found in Mindanao, of Asiatic origin; casuy (*Anacardium occidentale* L.), of American origin; siruelas (*Spondias purpurea* L.), from southern Asia; albudhod (*Spondias mangifera* Wild), found in Panay, also of Asiatic origin.

The mampon on pajomanga (*Mangifera altissima* Blanco).—This fruit is very similar to the mango, and when ripe is quite delicious. It is frequently preserved in brine in the form of pickles, and is very healthful; it is likewise made into sweetmeats and preserves. There are other small varieties of this kind about the size of an olive, which are used in making pickles and preserves.

ANONACEÆ.

Among this family is found the anona (*Anona reticulata* L.). It is an exotic from Mexico, its flesh being white and containing small, black pits. It is sweet and fragrant.

ATES (ANONA SQUAMOSA L.).

The fruit is juicy and aromatic, very sweet, and so soft that it seems to melt in the mouth; it is somewhat peppery. Another species found is Guanabano (*Anona muricata*). All three species come from America.

EBENACEÆ.

But one species of this family is indigenous to the Philippine Archipelago, the mabalo (*Diospyros discolor* Wild), whose reddish fruit,

about the size of a quince, contains a large seed; the flesh is white and sweet, but somewhat indigestible and has a rather strong odor. The sapote (*Diospyros ebenaster* Retz.) and the pagapat (*Diospyros kaki* L.) are natives of China.

GERANIACEÆ.

Of the American family there are two species, the balimbing (*Averrhora carambola* L.), which has the flavor of a quince, and the camias (*Averrhora bilimbi* L.), whose fruit when green has an agreeable, sour taste, but when ripe is sweet and fragrant.

GUTTIFERÆ.

Of this family the mangosteen (*Garcinia mangostana* L.) is found. It is an exotic, and grows only in Jolo and some points in the district of Zamboanga and Catabato. It is called there the "king's fruit," because it is so highly prized by the Moro sultans. It is dark red or purple in color and about the size of an orange. The edible and juicy parts of the fruit form small white divisions, very soft, which are found in the interior; they are covered with a double skin, reddish in color, and which must be removed before the fruit is eaten. The fruit is sweet and very delicate in flavor. Its origin is the Indian Archipelago.

MELIACEÆ.

In this family is found the lanzon or boboa (*Lansium domesticum* Jack). The tree is beautiful in appearance and gives a cool shade; the leaves are a beautiful clear green; the skin of the fruit is a clear yellow, thin and fine; within it are contained five divisions, as in the lemon, but the flesh is crystalline white, almost transparent, sweetish sour, quite delicate, and very refreshing. Each fruit contains a pit, which is the seed from which the tree grows; it is more bitter than gall, but is not injurious, on the contrary it is something of a carminative. One may eat a hundred of these fruits without difficulty and without danger, for they are healthful and excellent for those who suffer from heat. Their origin is the Malay Archipelago.

Santol (*Sandoricum indicum* Cav.) is a large tree having leaves 6 or 7 inches long. The fruit is bitter sweet in taste; it is used principally for preserves and pickles. Its origin is southern Asia.

MYRTACEÆ.

Macupa (*Eugenia malaccensis* L.) is a fruit about the size of a sweet pepper and of somewhat the same shape, rather larger and quite red in color; it is, however, more lustrous, being almost resplendent. It is bitter-sweet in taste, somewhat agreeable, but has no solid flesh which can be eaten.

Tampay (*Eugenia jambos* L.): This fruit is about the size of a small apple, the flesh being soft, sweet, and having an odor like roses.

Duhat or limboy (*Eugenia jambolona* L.): This produces a wild fruit, dark purple to black in color, about the size of an olive. It is likewise a native of the Malay Archipelago.

Guayabo (*Psidium guayaba* L.): This exotic plant comes from Mexico, but grows so well here that entire forests of it may be found. There are three principal varieties. The fruit is yellowish in color and

very aromatic, as are likewise the leaves. The interior of the fruit is filled with little, hard seeds or pits, which are embedded in the flesh. It is a carminitive, and its astringent properties make it an excellent preserve. With simple sirup it is much used.

MUSACEÆ.

The banana is the most important of this family. In the Philippines there is a large number of species, varying greatly in their form and taste. The trunk of the banana tree is not solid, but soft and full of minute little tubes or aqueducts, which serve to conduct the sap which sustains and matures the plant within the short space of one year. Shortly after the fruit ripens the plant begins to decline and the leaves dry up and fall. The fruit grows in bunches of various shapes, according to the particular species. Important varieties are the saba (*Musa sapientum* L.), which is delicious and healthful when ripe; the hanipa, sweeter than the saba, and which is cultivated principally in Samar and Leyte; the tambonan, a very common and healthful species; the camada, very large; the binalatong, larger, more delicate, and more fragrant than the preceding; the tarip; the bungaran, rather indigestible; the putian; the torlangdato, called in Spanish "the lady finger;" the pitbitin, a small, sweet, and rich variety; the dariao, a good variety; the mungco, the talood, the tinumbaga, the dariyas, and others. P. Delgado enumerates and describes 57 varieties, as may be seen in his history.

CARICACEÆ.

Of this family there is but one Philippine species worthy of mention, the papaya (*Carica papaya* L.). There are two sexes, the male and female. The male does not produce fruit, only some tubes filled with small white aromatic flowers; the female produces fruit. The tree is soft and yellow, looks somewhat like a palm, and has large, broad leaves; the fruit somewhat resembles a small quash in appearance. When it ripens, the skin changes from green to a reddish color, as does the flesh also. The fruit contains a number of seeds somewhat similar to squash seeds; it is sweet, refreshing, delicate, and pleasant to the taste. The tree is indigenous to America.

RUTACEÆ.

Of this family various oranges and lemons are found. Oranges of various indigenous species are found. The principal one is the cajel (*Citrus aurantium* var.). Another variety is the naranjitas (*Citrus aurantium*). There are several wild species, one of which is called "amumimtay" (*Citrus hystrix* DC.). They are very large, being 12 or 13 inches in circumference, have a thick skin, are very juicy and bitter.

There are more than seven varieties of lemons. The citron, which is very large, is also found in abundance.

SAPOTACEÆ.

The chico sapote (*Achras sapota* L.) and the chico mamey (*Lucuma mamosa* Gaert.) belong to this family. The fruit is about the size of an orange, green on the outside and black on the inside. It is sweet and agreeable and makes excellent preserves. It is a native of Mexico.

PLATE XVIII.

CHINAMAN CARRYING BANANAS.

URTICACEÆ.

Belonging to this family is the nangca or langca (*Artocarpus integrifolia* Willd.). It has been claimed that the fruit of this tree is the largest found in the world, as some of them are as large as a good-sized water jar. The tree is large and thickly branched; the leaves are long and narrow. The fruit is produced alike from the branches and from the main trunk of the tree quite close to the ground, and even from the roots, this last being especially true when the ground is somewhat elevated. The ripening fruit is recognized by its aromatic and penetrating odor; the fruit is then cut. When opened along the middle it shows a large amount of yellowish or whitish meat, which is not edible, and a number of shells of a golden color each containing a seed. It resembles in sweetness the date, but it possesses an odor like musk. It is somewhat indigestible, but is quite nourishing. The seeds when boiled or baked somewhat resemble the chestnut. The wood of the tree is yellow, solid, durable, and very serviceable for working. It is a native of the Malay Archipelago. Other species are figs (*Ficus carica* L.), from western Asia; the rima (*Artocarpus incisa* L.), from the Malay Archipelago; the dalanguian camansi (*A. camansi* Bl.), an indigenous plant, and the marang (*A. polyphema* Pers.), of Mindanao.

VARIOUS WILD SPECIES.

There is a large number of wild species of fruits found in the Philippines. They are in general sour, sweet, and somewhat carminitive. Among these may be mentioned the doctoyan, the pananquian, the durion, the abuli, amahit, angiap, amaga, agononan, abubunanu, alnganisan, dæ amamampang, bonano, barobo or marobo, cabaan, carong, cagos, gayan, dalinson, etc., which are described by P. Delgado.

CHAPTER X.

VARIOUS VEGETABLE PRODUCTS.

ESSENCES OR ESSENTIAL OILS.

There are various trees in the Philippines from which these essences or essential oils may be extracted, but the only ones utilized are the ilang-ilang (*Cananga odorata* Hook); sampaguita (*Jasminum sambac* L.); champaca (*Michelia champaca*, L.).

Ilang-ilang (*Cananga odorata* Hook, *Unona odoratissima* Bl.).—This tree, belonging to the family Anonaceæ, produces ordinary looking flowers of a greenish color, but of great fragrance. The tree is utilized as a shade tree, and from its flowers, especially those of the mountain trees, a highly valued essence is extracted by distillation. This essence, called "ilang-ilang," has been popularized by the Parisian perfumers. This essence is exported in small quantities to France, England, Singapore, and China.

Sampaguita (*Jasminum sambac* L.).—Sampaguita is a plant belonging to the family Oleaceæ. From the white fragrant flowers a highly prized essence is extracted by distillation by perfumers.

Champaca (*Michelia champaca* L.).—The champaca belongs to the family Magnoliaceæ, and is a tree about 4 meters in height, conical in shape. The flowers are very fragrant, and about an inch in length. It is much cultivated in gardens, but is not found in the mountains. By distillation a well-known essence is extracted from the flowers.

RESINS.

In the Philippines there is a large number of trees which produce resin. Some of these are used in medicine, some for illuminating purposes, others in the manufacture of varnishes, others in painting, and others for calking ships. The principal ones will be indicated by families:

Araliaceæ.—The limolimo (*Heptapleurum caudatum* Vid.) furnishes a resin used in the making of varnishes.

Burseraceæ (*Abilo*) (*Garuga floribunda* Decne.) produces a resin used in medicine. The antong or brea negra (*Canarium pimela* Kom) produces a resin used for illumination. The pili or brea blanca (*Canarium album* Bl.) produces a resin which is used for illuminating purposes and for calking ships. The papsaingin (*Canarium cumingii* Engl.) produces a resin used for the same purposes.

Coniferæ.—The galagala or piayo (*Agathis orantifolia* Salisb.) produces a resin which is used for burning, for lighting, and for the manufacture of varnishes.

Dipterocarpaceæ.—The apitong (*Dipterocarpus grandiflorus* Bl.) produces a resin used for illumination. Balao or malapaho (*Dipterocarpus velutinus* Bl.) produces a resin used for calking. The mayapas (*Dipterocarpus turbinatus* Gaert.) produces a resin similar to the pre-

PLATE XIX.

PALM TREES.

ceding one, which is used for the same purposes. The duagling (*Dipterocarpus* sp.) produces a resin useful for illuminating purposes. The guijo (*Shorea guiso* Blume) produces a resin used for the same purposes as the preceding; as does the yacal (*Hopea plagata* Vid.). The resin from the lauaan (*Anisopetera thurifera* Bl.) is used for burning, for the manufacture of varnishes, and for calking. The resin from the malaanonang (*Dipterocarpus* sp.) is used for calking. A resin used in medicine is obtained from the mayapis (*Dipterocarpus turbinatus* Gaert.), and one useful for lighting purposes is obtained from the paua (*Dipterocarpus vernicifluus* Bl.).

Enphorbiaceæ.—The resin from the alipata (*Excœcaria agallocha* L.) is used as a remedy for the bites of poisonous animals; taken internally it produces dysentery.

A medicinal resin is obtained from the birunga (*Macaranga tanarius* Muell-Arg.). The resin from the togocam (*Claoxylon wallichianum*, Muell-Arg.) is used for illuminating purposes and as a medicine.

Guttifera.—The binucao (*Garcinia* sp.) produces a resin used in medicine.

Leguminosæ.—The adyangao (*Albizzia procera* Benth) produces a resin used as incense. A resin having medicinal properties is obtained from the caturay (*Sesbania grandiflora* Pens.). A resin useful for illuminating purposes is obtained from the cupang (*Parkia roxburghii* G. Don.). Another resin used for the same purpose is obtained from the cogontoco (*Albizzia saponaria* Blume).

Melastomaceæ.—A resin used for illuminating purposes and for calking ships is obtained from the bota-bota (*melastoma obvolutum* Jack.).

Rutaceæ.—A resin used for illuminating purposes is obtained from the cajel (*Citrus aurantium* L.), orange tree.

Sapindaceæ.—The balinghasay (*Buchanania florida* Schau.) is used for illuminating purposes and for calking ships. An illuminating resin is obtained from the ligas (*Semecarpus perrottetii* March.).

Urticaceæ.—A resin from the breadfruit or antipolo (*Artocarpus mincisa* L.) is used as a medicine and as a bird lime for catching birds. The resin from the ambling (*Artocarpus ovata* Bl.) is used for making varnish. The resin from the camansi (*Artocarpus camansi* Bl.) is used as a medicine and as a drier. Nangca (*A. integrifolia* Linn. f.) produces a resin used for illuminating purposes.

GUMS (ALMACIGAS).

In the Philippines the name of almacigas is given to most of the yellowish and aromatic resins. The most valuable ones are found in the Calamianes, while others are found in Mindanao, especially in Davao and in Ilocos.

GUM RESINS.

The principal trees which produce gum resins useful in medicine, painting, or the arts are:

Anacardiaceæ, the casay or balubad (*Anarcadium occidentale* L.), which produces a gum resin used in the manufacture of varnish.

Apocyneæ, the dita (*Alstonia scholaris* R. Br.), which produces a medicinal gum resin, as do those of the species Laniti (Wrightia).

Euphorbiaceæ.—Medicinal resins are obtained from the bigabing (*Macaranga mappa* Mull. Arg.) and from the buta (*Excœcaria* sp.).

Guttiferæ.—The palomaria or bitao (*Calophyllum* sp.), the bitanhol (*Calophyllum wallichiana* Planch.), the gutagaby or tanglananac (*Garcinia morella* Derr.), and the gatasan-pula (*Garcinia venulosa* Choisy) produce gum resins used in medicine.

Leguminosæ.—Two gum resins used in medicines are derived from the aromo (*Acacia farnesiana* Willd.) and the narra encarnada (*Pterocarpus indicus* Willd).

Myristicaceæ.—Medicinal resin is obtained from the dugoan (*Myristica* sp.).

Palmæ.—The bonga (*Areca catechu* L.) produces a resin used in medicine.

Rutaceæ.—The lucban or naranjo (*Citrus decumana* Murr.) produces a gum resin likewise used in medicine.

Urticaceæ.—The balete (*Ficus indica* Bl.) and the banyan tree (*Ficus* sp.) produce gum resins used in medicine.

Sapotaceæ.—The notac (*Palaquium* sp.) produces a gum resin used as a glue and for other industrial purposes.

GUTTA-PERCHA.

Gutta-percha is found in considerable quantity in Mindanao, and is produced from the trunk and branches of several trees, from those of the genera *Ficus* and *Palaquium*. This tree is called by the Visayans solonot. In collecting this it is not best to follow the plan used by the natives of cutting down the tree; large trees only should be selected, and these should be tapped. Beneath this incision on the bark or the trunk a bombon or large tube of bamboo is placed to collect the supply. This product is then placed in a batea, or dish, where it is macerated with salt water, the dish being at the same time shaken. In this way the gutta-percha soon becomes solid; the water is then poured off and the gutta-percha is formed, while still plastic, into a plate or disk, but through the edge of which a hole is made, suspending it, and thus exposing it to the air, so that it may dry perfectly. This method produces gutta-percha of rather inferior quality.

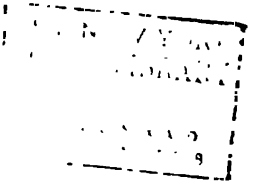
A few years ago a considerable quantity of gutta-percha was exported to England, but on account of the many adulterations made by the Chinese merchants but little is now exported.

VEGETABLE WAX.

Many plants produce a certain amount of an oily material somewhat similar to beeswax. It is found sometimes as a deposit on the surface of leaves, fruit, or on the bark. This material is not of the same quality in all vegetables, although it has not been well studied. It is obtained from the palm (*Ceroxylon andicola*) and from the *Myrica cerifera*. It is found in the Philippines, in the Calamianes, in Paragua, and in some other parts. It is obtained from the trees by scraping the bark.

PAPER NO. VI.

TIMBER AND FINE WOODS.



TIMBER AND FINE WOODS.

The magnificent forests of the Philippine Archipelago constitute a source of great natural wealth, which is as yet almost undeveloped. They yield woods valuable for a great variety of purposes, and many of these woods are to be had at present in very great abundance. Certain of them are unexcelled for sea piling and shipbuilding, not only because of their great strength, but on account of the fact that they are proof against the attacks of the sea worm (*Teredo navalis*). Others are particularly adapted to house construction in climates where humid atmosphere and intensely hot sun subject them to the severest tests. There are woods suitable for boat building, carriage building, and box making, and, finally, there are a considerable number of heavy, hard, fine-grained, and beautifully colored woods, which are admirable for cabinetmaking, and would make beautiful floors and inside finishings for the houses of those who could afford to pay for them.

No systematic effort has ever been made looking to the exploitation of these woods, nor have they ever been carefully studied. The lumber used for local purposes in the archipelago is almost entirely hewn out or sawed by hand. So far as we are aware, there are at present but two steam sawmills in the Philippines. This is the more remarkable when one remembers that the local demand for lumber is steady and good, while China affords an excellent market for many of the better known woods.

An explanation of this singular state of affairs may be found by taking into account the conditions which have existed in the past. It was formerly a tremendous undertaking to get machinery through the custom-house at Manila. The Spanish Government, more or less, systematically interfered with the commercial development of the archipelago in this and other ways, and was especially hostile to all enterprises backed by foreign capital. While it was easy under the old laws to obtain a license to cut timber on government land in one or more provinces, one could not ship it after it was cut until it had been surveyed by a government official and a tax paid upon it at so much per cubic foot, the rate varying for the different classes of woods.

It was, of course, easy for the government officials to fail to send an inspector until lumber rotted where it lay, and in this and other ways it was easy for the government to control not only the amount of timber cut but the places for cutting it. In the early days of the Philippine lumber trade the government seized an entire ship's cargo of very valuable wood upon a flimsy pretext, and this occurrence, as well as the other facts above mentioned, served to make capitalists shy of investing heavily in what seemed a rather precarious enterprise.

Heavy investment was necessary to the successful carrying on of a lumber business. It often happened that wood cutters were not to be found near the best forests and had to be brought from a distance.

This necessitated the making of cash advances to them in order that they might leave money behind for the support of those dependent on them. After houses had been erected so that they could live with their families, their improvident nature still rendered it necessary to make them constant advances against their future earnings. The sums invested in this way were often considerable, and a heavy percentage of loss had to be allowed for, as it was impracticable under the old judicial system to compel laborers to fulfill their contracts.

It can not be doubted that under changed conditions and reasonable laws the lumber business in the Philippines will rapidly attain to greatly increased importance, while ebony and others of the very hard and beautiful woods will be placed upon the European and American markets. The labor problem will continue serious, for the present at least, unless Chinese are employed. The natives are wedded to their old customs and will insist on the usual advances, but as it is customary to pay them by measure for timber cut and delivered at some point previously agreed upon a lack of industry on their part does not necessarily result in financial loss to their employers. Lack of suitable means for land transportation will continue more or less of an obstacle for some time to come, and it will at first be necessary to confine operations to forests situated moderately near the sea or the larger fresh-water streams.

The most extensive forests are to be found in Mindanao, Basilan, Tawi Tawi, Balabac, Palawan, and Mindoro. There are also very large areas in Luzon where no cutting has ever been done. In Samar, Masbate, and parts of Panay there are still considerable quantities of valuable timber. This is also true of Biliran, Tablas, Sibuyan, and many others of the smaller islands.

The forest lands are, for the most part, the property of the Government. On account of their great value, suitable means should be promptly taken for ascertaining their extent and for preventing trespassing upon them. There has been much needless destruction of valuable timber in the past. The plantations of the natives are speedily invaded by "cogon" and other strong-growing grasses, which they are powerless to combat with the crude agricultural implements at present in use, so they simply clear more forest land from time to time, and often burn the felled trees where they lie.

The number of species of woods found in the archipelago is very large, as will appear from the subjoined list, which is, however, necessarily very incomplete. A careful investigation into the properties of these woods is greatly needed, and the results obtained would undoubtedly abundantly justify any reasonable expense which might be incurred.

For further information concerning the lumber business in the Philippines see the testimony of Mr. Collins, volume of testimony, page 79, and of Mr. Von Bosch, page 108.

A LIST OF PHILIPPINE WOODS, WITH BRIEF DESCRIPTIONS OF THE MORE IMPORTANT OF THE KNOWN SPECIES.

In preparing the subjoined list of Philippine woods, use has been made of the testimony taken by the commission and of the list given by Mr. John Foreman in his book, The Philippine Islands, as well as of a pamphlet entitled "Breve Descripcion de Algunas de las

Maderas Mas Importantes y Mejor Conocidas de las Islas Filipinas," by Don Sebastian Vidal y Soler.

It was found that a part of the official collection of woods belonging to the "Inspeccion de Montes" was in the hands of former United States Consul O. F. Williams, he having purchased it from some private individual. Consul Williams kindly loaned this collection to the commission, but other work prevented a detailed examination of the specimens before he required it again. At the last moment, brief notes were taken on the color and weight of the blocks. Some of the labels had been injured by insects, but so far as they were legible, the names of the woods in this collection have been incorporated in the list, with the above-mentioned information.

It has been found that a number of the woods are entered under different scientific names in different lists; in some instances no scientific name is given; in others, we find the generic name only, or the generic and specific names without the name of the author. In general, it is not too much to say that the classification of the trees which produce good woods in the Philippines is in a decidedly chaotic state, and it is to be hoped that some competent botanist will come to the rescue in the not far distant future.

1. Aclang-parang (*Albizzia* sp.).—A wood of medium weight and dark ash color.

2. Acle (*Mimosa acle* Bl.).—A tree of large size, giving logs up to 32 feet long by 28 inches square. Wood a dark, dull red. It is strong, tenacious, and durable and takes a good polish. It is difficult to burn, and is much used for house construction in the Philippines, as well as for shipbuilding. It also affords an excellent charcoal. It is a hard wood with wavy grain and small pores. It has no perceptible odor. It breaks in long splinters and gives a rough and only slightly curled shaving.

3. Alaqao (*Premna* sp.).—A heavy wood of ashy color.

4. Alahan (*Diospyros* sp.).—An ashy wood of heavy weight.

5. Almasiga or antang (*Dipterocarpus* sp.).—A light wood of ashy color. The tree distills a valuable gum.

6. Alintatao (*Dispyros philippinesis* F. Vill.).—A tree with dark, hard wood like ebony.

7. Alupay or Lecheas.—Yields a heavy wood of dark-gray color.

8. Amuguis (*Cyrtocarpa quinquestila* Bl.)—Yields a moderately hard wood, light red or flesh colored, and sometimes marked with lead-colored spots, with numerous pores of moderate size. It breaks in long splinters. It gives good boards, which are employed in house and ship building. This wood would be much used in the Philippines were it not so subject to the attacks of white ants.

9. Amuyong (*Melodorum fulgens*).—A light straw-colored wood.

10. Anagap.—The tree reaches a height of 60 feet, and gives logs up to 18 feet long by 16 inches square. The wood is a grayish yellow, of fine grain and somewhat brittle. It breaks in long splinters. It is used for furniture, inside house trimmings, and for other purposes where a light, durable wood is required which need not be exposed to the sun or rain.

11. Anosep or Anusep.—Yields a wood of brownish or ashy red color and fine grain, with small pores, but somewhat fibrous. It is used, though not to any great extent, for building purposes.

12. Antipolo (*Artocarpus incisa*, L.).—Tree of large size. Yields a wood varying in color from grayish yellow to canary yellow, and even dark red; sometimes marked with numerous white spots. Its texture is fibrous, and the pores are strongly marked. It breaks in long splinters. It is highly prized for outside planking and keels of vessels, for it is light, very strong, resists sea worms (*Teredo navalis*) entirely, and is not affected by climate. It does not warp when once seasoned, and is a very valuable wood. It is even somewhat used for cabinet work, but is not very highly prized for this purpose.

13. Anubing, or Anubiong, or Anubin (*Artocarpus ovata*).—Tree of moderate size. Wood a brownish yellow to dark red. Of fine texture, with small pores. It breaks in short splinters. Much used for rafters in the native houses.

14. Apiton (*Dipterocarpus grandiflorus* Bl.).—Tree of very large size. It distills an odorous and resinous gum, similar to that known to commerce as malapaho and employed in varnishing furniture, but it does not serve as a substitute for the latter gum. The wood is a light or dark greenish gray, with lighter or even white spots. It is of fine texture and brittle. It has no noticeable odor, and breaks in long splinters. According to Foreman it yields logs up to 70 feet long by 24 inches square. The wood works well, and serves for furniture and general joiner's purposes. Vidal rates it as a wood of third or fourth class.

15. Aranga (*Homalium* sp.).—Trees are very large size, giving logs up to 75 feet long by 24 inches square. The wood is of reddish color, with violet stripes. It is of compact texture and straight grain, though somewhat brittle. It is especially valuable for sea piling and shipbuilding, since it resists well the attack of sea worms.

16. Asac-talon.—A very heavy wood of dark-red color.

Asana. See Narra.

17. Bacauan (*Bruguiera caryophilloydes* Blum.).—A very heavy wood of dark-red color.

18. Bagarilao (*Nauclea* sp.).—A light wood of dark-red color.

19. Bahay (*Lepidopetalum perrottetii* Blum.).—A straw-colored wood of medium weight.

20. Balacat (*Zyzyphus* sp.).—A light straw-colored wood of medium weight.

21. Balao, malapaho, or panao (*Dipterocarpus vernicifluus* B. L.)—Tree of medium to large size. Wood yellowish white or light greenish gray; sometimes with tints of light rose and yellowish red. Texture quite variable, from soft to solid. It is fibrous, sometimes breaking in threads, and at others in short splinters. The pores are slightly marked. It is commonly used in house building, but less so for ship construction. Canoes are made from it, although it is not one of the woods most commonly employed for this purpose. Sometimes the reddish-yellow variety of comparatively firm texture is sold for ipil, to which it is inferior; but upon careful examination it is readily distinguished from the latter wood, especially if one notes the size and distribution of the pores. It may be considered a second-class wood. It produces the resinous gum known as balao or malapaho, which is fluid and odorous, and is employed for varnishing furniture, picture frames, etc., as well as for floors of rooms. Some business is done in it, but it is not very highly thought of.

22. Balayohod.—A dark grayish wood of medium weight.

23. Balibago (*Hibiscus tiliaceus* L.)—A light white wood.

24. Batitinan (*Lagerstrœmia batitinan*).—Tree of large size, giving logs up to 40 feet long by 18 inches square. The wood varies in color from an ashy red to an intense olive brown. It is of firm to very firm texture, with numerous small pores. It is very strong, tough, and elastic, and is commonly used for ships' planking above water. When properly seasoned it stands the climate well, but will not resist burial in the ground or exposure to sea worms. It is much stronger than teak, and could be used to advantage in place of the latter wood for almost all purposes. It can also be used for furniture, and may be considered a first-class wood.

25. Banaba (*Lagerstrœmina speciosa* Pers.).—Tree 30 to 50 feet in height. The wood varies in color from reddish white to dull red. The fibers are longitudinal and compressed. The pores are broad and short, looking sometimes like tiny cracks. The wood breaks in short splinters, and its shaving is rough, porous, and little inclined to curl. The white variety is of coarser texture than the red, and its qualities are inferior. The red is the kind preferably employed for ship and house construction. The wood is highly appreciated on account of its strength, and it resists the elements well, lasting for a long time under water.

26. Banatanhisan.—A heavy wood of light brown color.

27. Bangcal or Bancal (*Sarcocephalus cordatus* Mig., *Nauclea glaberrima* D. C.).—Tree of large size, giving logs 24 feet long by 16 inches square. Wood of a golden yellow color, or sometimes greenish yellow. Grain straight. Texture somewhat fibrous, but pores little marked. It breaks in long splinters. The wood is very easy to work, and is used in house building and in general joiner's work, but its most important use in the Philippines is for the construction of small canoes.

28. Bani.—A very light white wood.

29. Bannin.—A heavy white wood.

30. Bansalagui (*Mimusops elengi*).—Tree is of great size, giving logs up to 40 feet long by 18 inches square. According to Foreman it is known in Europe as "bullet-tree wood." The wood is reddish white, with ashy spots, or a uniform bright red. It is of solid texture, fibrous, with small pores, and breaks in long splinters. Pins of it can be driven like bolts, and from this fact, and on account of its durability, it is much used in shipbuilding at Manila. It is well suited for making tool handles, and on account of its close grain is admirably adapted to turning, while its strength, elasticity, and durability mark it as a first-class wood.

31. Bansio.—A whitish wood of medium weight.

32. Bantigui.—A heavy, fine-grained wood, resembling rosewood in appearance.

33. Banuyo (*Dipterocarpus* sp.).—A straw-colored wood of medium weight.

34. Barusang.—A heavy grayish-yellow wood.

35. Baticuling or Baticulin (*Milingtonia quadripinnata* Bl.).—Wood of a yellowish white or a greenish white, of soft texture, with numerous pores, of moderate size, with delicate, but clearly visible, medullary rays. It is easy to work, and takes a good polish. It is employed for joiners' work. There are many varieties.

36. Batino (*Dipterocarpus* sp.).—Straw-colored wood of medium weight.

37. Bayucan (*Dipterocarpus* sp.).—A heavy wood resembling maple in appearance.

38. Betis (*Azaola betis* Bl.).—Tree of large size, sometimes giving logs up to 65 feet long by 20 inches square. The wood is brownish red or light red, with ashy-brown spots. Its texture is firm, with pores small and slightly marked. It is brittle, and breaks smoothly. It is a most valuable wood, especially useful for the keels of vessels, as it is proof against sea worm. It is also used for salt or fresh water piling, piers, wharfs, etc.

39. Binayoyo.—A heavy reddish wood.

40. Binnang (*Macaranga mappa*, Mull. Arg.).—A very light wood of grayish-white color.

41. Binunga (*Macaranga tanarius*, Mull. Arg.).—A reddish wood of medium weight.

42. Bitag (*Calophyllum* sp.).—A reddish-brown wood of medium weight.

43. Bitang (*Calophyllum spectabile*, Willd.).—A grayish wood of medium weight.

44. Bitanhol or *Bitanjol.* *See* Palo-Maria.

45. Bolongita, Bolongeta, or Bolonzeta (*Diospyros pilosanthera* Bl.).—Wood a light-red color, or dark red, with streaks and spots of black. It is of firm texture, with only slightly marked pores, and gives a delicate shaving, flexible and curling. It breaks in short splinters. It is very useful both for building and cabinetwork.

46. Bayug (*Pterospermum acerifolium* Willd.).—A grayish-yellow wood of medium weight.

47. Bucbuc (*Streblus* sp.).—A heavy white wood.

48. Bulac.—A white wood, very light and pithy.

49. Buna.—A heavy, grayish-yellow wood.

50. Caba (*Fragræa* sp.).—A light whitish wood.

51. Cabuy (*Citrus histrix* V. C.).—A heavy white wood.

52. Calamansanay (*Stephegyne* sp.).—Wood varies in color from rosy white to bright red. Frequently of uneven color and has more intense spots. It is of firm texture and brittle, with pores slightly marked or imperceptible. When dry it is odorless, although when first cut it sometimes gives out an acid odor. It usually breaks in long splinters, although this is not always the case. The wood is useful for building and construction.

53. Calantas or Philippine cedar (*Cedrela odorata* Bl.).—Tree of great size, giving logs up to 40 feet long by 35 inches square. The wood is flesh color, brick red, or, in some varieties, a pale, ashy red. The pores are slightly marked, but the texture is somewhat coarse. It breaks in short splinters. Its odor is agreeable and insects attack it very little. It is used chiefly for the manufacture of cigar boxes. It also makes very handsome inside house fittings.

54. Calimanlao (*Diospyros* sp.).—A light yellowish-white wood.

55. Calobcub (*Eugenia macrocarpa* Roxb.).—A very heavy wood, varying in color from dark brown to black.

56. Calumpang (*Sterculia fœtida* L.).—A tree of very great size. Its wood is not highly valued, and is employed cut into boards. It is of brownish-yellow color, with pores slightly conspicuous, but numerous. It is easy to work, but lasts only a short time in the Philippine climate.

57. Calumpit (*Perminalia edulis* L.).—Tree of moderate size. Its

BALETE TREE (IN A TOBACCO FIELD).

wood is of dull-yellowish color, with ashy spots, or of a uniform ash color. It is soft, with straight grain, and somewhat brittle. Pores well marked and very numerous. It breaks in long splinters. Its ripe fruit, a drupe with black skin and red flesh, is edible. Its bark is used in some localities for dyeing cotton, which it stains a dirty straw color.

58. Camagon (*Diospyros pilosanthera* var.).—Tree of moderate size. Wood black, with narrow brown or yellowish-red streaks, and sometimes with black spots. It is of very solid texture, with straight longitudinally compressed fiber and broad, short pores, slightly marked. It takes a good polish, and breaks almost square. Its shaving is somewhat rough, is compact, and does not curl at all. The wood is highly valued for cabinetwork on account of its color and polish. It is often confounded with ebony. It ordinarily comes into the market in logs 9 or more feet in length up to 12 inches in diameter.

59. Camayuan.—Wood of very variable color. In some samples it is light red, in others violet, while yet others are bright red or brownish red. Spots, streaks, and clouds of a color different from that of the mass of the wood are found. It is probable that several different woods are known under this name, which would explain the fact that in some samples the texture is very firm and compact, with almost imperceptible pores, while others are merely fine grained, not hard. Some have a strong and agreeable odor, while others are odorless. It breaks in short splinters, and is employed for building purposes, both in the form of small pieces and in boards.

60. Camuning (*Muraya exotica* L.).—Tree of small size, ordinarily 12 to 15 feet high. Wood a bright ocher yellow, uniform or with wavy streaks and spots of brown. It is of compact texture, is quite hard, and lasts extremely well. It is used chiefly for cabinetwork. The Moros of the southern islands use it in making handles for their weapons. It is a beautiful wood and takes a fine polish. It is not employed for building on account of the small size of the pieces obtainable.

61. Canafistula (*Cassia fistula* L.).—A medium-weight wood, white or light reddish in color.

62. Cani-oi.—A wood of weathered grayish color and medium weight.

63. Caronsan.—A heavy grayish-white wood.

64. Catmon (*Dillenia philippensis* Rolfe).—A heavy wood, resembling rosewood in appearance.

65. Cayantol.—A heavy grayish-white wood.

66. Cayatao.—A heavy reddish wood.

67. Caytan (*Zanthoxylum oxiphyllum* Edg.).—A heavy grayish-yellow wood.

68. Cubi.—Wood yellowish brown with greenish spots. Its texture is moderately compact. The pores are numerous and of small size and are uniformly distributed. It is much used in building, chiefly for joiners' work, and is said to last very well.

69. Culing-manoc.—The color of this wood varies from a rosy white to brick red, sometimes with streaks and spots of lighter color. Its structure is very compact. The pores are well marked and show a whitish color, which makes them conspicuous. The wood is brittle and breaks in long splinters. It has no odor. It is a good wood for building purposes, although not in common use in the Philippines. It is also somewhat used for cabinetwork.

70. *Culis* (*Memecylon edula* Roxb.).—A heavy grayish-yellow wood.

71. *Cupang* (*Parkia roxburghii* G. Don.).—A light wood of reddish-brown color.

72. *Dao* (*Dracontamelum* sp.).—A light wood of dark-grayish color.

73. *Dale* (*Terminilia*).—A reddish-brown wood of medium weight.

74. *Dangay or Bangay* (*Grewia* sp.).—A reddish-gray wood of medium weight.

75. *Dangon or Danglig* (*Dipterocarpus* sp.).—A grayish-yellow wood of medium weight.

76. *Dinglas* (*Buciba cumintana* Bl.).—Tree of good size, giving logs up to 30 feet long by 16 inches square, and sometimes even larger. Wood brownish or ashy red. Texture fine, with pores of moderate size. The wood is hard, heavy, and little subject to the attacks of insects. It is employed in the construction of edifices and ships, and would make a good substitute for black walnut. It is very durable.

77. *Dilang-butigui* (*Podocarpus* sp.).—A wood of light-gray color and medium weight.

78. *Dita* (*Alstonia scholaris*).—A grayish-yellow wood of medium weight.

79. *Dolitan-puti* (*Garcinia* sp.).—A heavy grayish-yellow wood.

80. *Dubat* (*Eugenia* sp.).—A heavy dark-red wood.

81. *Dungol, or Dungon, or Dongon* (*Sterculia cimbifromis* D. C.).—Tree of large size, giving logs 50 feet long by 20 inches square. The wood is pale reddish in color and firm in texture. It is crossgrained, with inconspicuous pores. It has an odor of tanned leather. Its shaving is rough and only slightly inclined to curl. This wood is very hard to work, but lasts well. It is much used both in house and ship building, where more than ordinary strength and considerable length is required. It is especially strong in resisting heavy transverse strains, and is therefore much used for roof timber and for the keels of vessels, although it does not resist the attacks of sea worm.

82. *Ebano or Luyong* (*Diospyros nigra* L.).—*Ebony.*—This wood differs from camagon in its more intense and uniform black color, without brown or yellow streaks. It is very valuable for cabinetwork, and is also employed in the Philippines in making gunpowder.

83. *Gatasan-pula* (*Camingiana* sp.).—A heavy red wood.

84. *Gueyalas.*—A reddish-brown heavy wood.

85. *Guijo, Guiso, or Guisoc* (*Dipterocarpus guiso* Bl.).—Tree of very large size, giving logs up to 75 feet long by 24 inches square. Wood light red to dark red in color and of solid texture. It is crossgrained, with inconspicuous pores. It has an odor of tanned leather. It breaks straight across or into fibers. The shaving is rough and but slightly curled. It is hard to work, but very durable, and is strong, tough, and elastic. In Manila it is used for carriage shafts. In Hongkong it is employed for wharf decks and flooring. There are a number of varieties.

86. *Guim.*—A heavy grayish-yellow wood.

87. *Guyo.*—A heavy reddish-yellow wood.

88. *Halupag.*—A very heavy red wood.

89. *Himbabao.*—A grayish-yellow wood of medium weight.

90. *Ilang-ilang, or Alang-ilang* (*Unona odoratissima* L.).—A tree better known for its flowers, from which is produced a valuable perfume, than for its white wood, which is soft and does not last well, being very subject to the attacks of insects.

91. Ipil, or Ypil (*Eperua decandra* Bl.).—Tree of very large size, giving logs up to 50 feet long by 26 inches square. The wood is usually dark red, but in some cases is ocher yellow. The color grows more intense with age, especially in the red varieties. It is a tough wood with conspicuous pores. It has a slight but agreeable odor. It breaks in short splinters, and gives a very rough and closely curling shaving. It is a most excellent wood for building purposes and joiners' work. It has all the good qualities of molave, except resistance to sea worm, and lasts as well under ground. It is excellent for railroad sleepers. Attempts are often made by native dealers to substitute balao or supa for it.

92. Jagud.—A very light whitish wood.

93. Lanaan (*Anisoptera thurifera*).—A dark grayish wood of medium weight.

94. Lanete, lanate, or lanite (*Anasser laniti* Bl.).—A tree of moderate size, giving logs up to 25 feet long by 18 inches square. Its wood is bone white, or ashy white with white spots. It is of soft and compact texture, with inconspicuous pores. It breaks in long splinters and gives a delicate, curling shaving. It is valuable for cabinetwork, and is used for carved objects, musical instruments, inside decorations, and turning. It has also been used for making match boxes.

95. Lanutah (*Hibiscus*).—Wood of reddish white or light red color, with narrow yellowish streaks. It is of fine texture, with straight grain and small pores. It is easy to work. It is commonly employed in cabinetwork and for inside finishing of houses.

96. Lauan, lauaan, or saudana (*Dipterocarpus thurifera* L.).—Tree of large size, giving logs up to 75 feet long by 24 inches square. It yields a white and hard resinous gum, which has a strong odor and is sometimes used for incense in the churches. The wood is reddish white in color, or ashy with brown spots. It is soft and fibrous, with strongly marked pores. Its principal use is for the construction of canoes. It is said that the old Mexican galleons had their outside planking made of this wood, because it did not splinter when struck by cannon balls.

97. Liga.—A heavy reddish-gray wood.

98. Lipo (*Eugenia* sp.).—A heavy white wood.

99. Loctob (*Ficus laurifolia* Blanco).—A grayish-yellow wood of light weight.

100. Mabolo (*Diospyros isocolor* Willd.).—A very heavy white wood.

101. Macasim, macasin, or macaasim.—There are two varieties, the red and the white. The former is very similar to batitinan in color, but is distinguished by its more compact texture and less conspicuous pores. It breaks square across and is less useful than batitinan for house and ship building. The second variety is of lighter color with yellowish streaks. It is considerably used for inside housework and flooring. It is somewhat inferior to banaba, but longer and broader boards can be obtained from it.

102. Macupa.—A very heavy red wood.

103. Magarambulo.—A heavy wood of grayish-yellow color.

104. Malaanunang (*Shorea malaanunang* Bl.).—A light wood of grayish-yellow color.

105. Malabayabas.—A very heavy wood, dark brown or black in color.

106. Malabonga (*Laurus hexandra* Pers.).—Tree of moderate size.

Wood light red with orange streaks and sometimes with lead-colored spots. It does not last well in the Philippines, as insects attack it, especially white ants. Its flattened fibers, numerous medullary rays, and large, compressed pores are characters which make it easily recognizable. It is especially used for making common boxes.

107. Malacadius (*Litsea chinensis* Lam.).—Wood canary yellow, darkening with time, and taking on greenish-brown tints. Texture fine, grain straight, pores inconspicuous. It breaks square across, and is odorless. It is used for beams and ribs in shipbuilding, and also gives good boards.

108. Malacainote.—A very heavy wood of reddish-brown color.

109. Malacatmon.—There are several varieties of this wood of different colors, two of which are especially deserving of mention. The first is brick red, with spots and streaks of black. Its pores are only slightly visible, while its medullary rays are numerous and well marked. The second is red, with a few streaks and spots of lead color. Its pores are abundant and conspicuous. Both are somewhat used for building purposes.

110. Malacumon (*Dillenia* sp.).—A heavy straw-colored wood.

111. Maladujat, Malarujat, or Malaruhat (*Myrtus subrubens* Bl.).—Tree of large size. Wood of brownish-yellow color, with streaks of intense brown or ash. Occasional examples are earth red, with white spots. A compact and brittle wood, with delicate pores, which are sometimes quite conspicuous. It breaks square across, gives good boards, and is also somewhat used in making common furniture.

112. Malagaitmun—A heavy straw-colored wood.

113. Malaiba (*Phyllanthus* sp.).—A light wood of whitish color.

114. Malaitmo (*Celtis philippinensis* Blanco).—A heavy, light-colored wood.

115. Malubig (*Syzygium* sp.).—A heavy wood of dark-gray color.

116. Malanangca.—A heavy white wood.

117. Malapaho (*Dipterocarpus velutina* Blanco).—A heavy dark-red wood.

Malaruhat. See Maladujat.

118. Malasantol (*Thespesia populnea* Corr.).—A heavy wood of whitish color.

119. Malatalan, or Malatalang.—A somewhat brittle wood of reddish color, with spots and streaks of black. Of fine grain with moderate sized pores. It is not much used for building.

120. Malatapay (*Alangium octopetalum* Blanco).—A yellowish wood spotted with brownish black, the spots growing darker with age. Texture very compact. It breaks in short splinters. Highly valued in the Philippines for the construction of fine furniture. The tree is small and unfortunately not abundant.

121. Malatiuong.—A heavy wood of grayish-yellow color.

122. Malato.—A light wood of reddish color.

123. Malatoob.—A dark-gray wood of medium weight.

124. Malatumbaga (*Crudia spicata* D. C.).—Tree of large size. Wood varies in color from flesh red to brick red. It is of compact texture and easy to work. It is not at present much employed for building purposes. It gives very good boards for box making.

125. Malauhud.—A straw-colored wood of medium weight.

126. Malaya.—A dark-gray wood of medium weight.

127. Mambog (*Stephengyne diversifolia* Hook.).—A light wood, grayish-white in color.

128. Manabang.—A heavy wood of yellowish-white color.

129. Mancalamian.—Wood of a reddish color with lighter streaks. Its texture is fine, somewhat fibrous, with numerous inconspicuous pores. Insects attack it. It is little employed in building in the Philippines. Only the natives use it in Luzon, and it is not ordinarily to be had in the market at Manila.

130. Manayao.—A grayish-yellow wood of medium weight.

131. Mancono (*Xanthostemon verduganianus* Nav.).—A very hard and heavy wood found in the island of Mindanao. It is said to be a species of lignum vitæ. It is of a deep chocolate color.

132. Mangachapuy or Mangachapoi (*Dipterocarpus mangachapoi* Bl.).—Tree of large size, giving logs up to 55 feet long by 20 inches square. The wood is of two varieties, called red and white. The latter of these has compressed fibers and longitudinal pores, and is of compact texture, but brittle, breaking square across or in long splinters. Some specimens give off the odor of linseed. The shaving is somewhat rough, and hardly curls at all. The red variety is less common, and is distinguished from the white only by its color. The wood of both varieties is very elastic, and when seasoned withstands the climate as well as teak. It is used for masts and decks of vessels, and for all work exposed to sun and rain, and is a very valuable wood.

133. Mangasinoro (*Fagroca volubilis* Jack.).—Tree of very large size. The wood is ordinarily an ashy yellow, of straight grain, somewhat fibrous, and of porous texture. It is soft and not very durable, and is consequently little used in building.

134. Manicnic or Manipnip.—Wood ashy red or light ashy. Texture solid to very solid. Fibrous, with pores distinctly or very plainly marked, and the fiber somewhat twisted. It breaks in short splinters. It is used in house building, although not very extensively.

135. Mapulat (*Pelagium* sp.).—A straw-colored wood of medium weight.

136. Mara, Maran, or Marang.—The wood is a reddish yellow, of sometimes a dirty greenish white. It is of moderately fine texture. It breaks square across. It is probable that several woods are confounded under the above name.

137. Mayapi, or Mayapis (*Dipterocarpus mayapis* Bl.).—Tree of large size. Wood reddish, with colored streaks and spots. It is soft and does not last well. On account of its lightness and the ease with which it can be worked, it is considerably used for box making.

138. Midbid (*Lagerstramia* sp.).—A heavy wood, of reddish brown color.

139. Molave (*Vitex geniculata* Bl.).—Tree of good size, giving logs up to 35 feet long by 24 inches square. Wood yellow, yellowish green, or ashy, of compact and fine texture, with small pores frequently almost imperceptible. Its odor is slightly acid, and it stains water yellow. It has a slightly bitter taste. It breaks in short splinters. Its shaving is delicate, flexible, and curling. Molave resists sea worms, white ants, and the action of the tropical climate. It is an extremely strong and durable wood, of great value. It lasts well under ground. Foreman characterizes it as "practically everlasting," and quotes Mr. Thomas Laslett, timber inspector to the British admiralty, as saying that "It can be recommended to notice as being fit to supplement any of the hard woods in present use for constructive

purposes." It is very highly valued in the Philippines for building purposes, and is called by the natives "The queen of woods."

140. Mulang-u.—A heavy wood of dark gray color.

141. Narra, Naga, or Agana.—There are two species. The first of these comes from *Pterocarpus santalinus* L. The tree is large, giving logs up to 35 feet long by 26 inches square. The wood is known as the mahogany of the Philippines, and is much employed in the manufacture of furniture. It varies in color from scarlet to blood red, is of solid texture, but very brittle. It easily takes a beautiful polish; it breaks in short splinters; it has an agreeable odor; it is an admirable wood for cabinet purposes. From the bases of the trunks of the largest trees magnificent pieces are sometimes obtained of sufficient size to make tops for large dining tables.

141. Narra Blanca, or Narra Amarilla, Naga Asana, or Agana (white or yellow Narra).—From the species *Pterocarpus pallidus* Bl. Its wood is ocher-yellow with brown streaks. It darkens with time, taking a brownish-yellow color. There are specimens which show a color intermediate between that of this and the preceding species. The texture is fine and the pores are usually less conspicuous than in red narra. It breaks in long splinters. Both species distill a resinous gum of reddish color. It is very fluid at first, but hardens upon drying, and is employed in finishing furniture.

142. Nato (Sterculia balanghas L.).—Tree of large size. Wood reddish white with delicate spots of more intense color; sometimes it is rosy and occasionally even brick red. It is of compact texture, fibrous, breaks square across, and has no noticeable odor. It is used especially for joiner's work.

143. Opac.—A very light wood, yellowish white in color.

144. Pagatpat, Palopad, or Palatpat (Sonneratia pagatpat Bl.).—Tree of moderate size, frequent along the seashore, growing with its trunk partially submerged at high tide. Its roots send up conical processes from the sand for a considerable distance around its base, producing a singular appearance. They somewhat resemble cork on account of their soft, spongy structure and their small weight, The natives use them in place of cork. The wood is reddish in color and of various tints. Its texture is moderately compact. It is used somewhat for building, especially for work under water. It is superior to the wood of the other mangroves (species of the genus Rhizophora), which are not here described on account of their small importance. It does not find a very ready sale at Manila.

145. Pahuhutan (Mangifera longipes Griff.).—A light white wood.

146. Pait.—A very heavy red wood.

147. Paitan.—A light white wood.

148. Palayen or Roble.—Several species of the genus Quercus occur in the Philippines.

149. Palms.—Numerous genera of this extensive family are represented in the Philippines, such as Cocos, Arica, Borassus, Calamus, Caryota, Coripha, etc. From one and another of the species the natives get food, drink, houses, clothing, and illuminating oil. For structural purposes the species known collectively under the name "Palma brava" are most important. The hard outer wood resists moisture very well, and the natives convert their trunks into tubes for conducting water by simply removing the inner fibrous portion. Palma brava is also used for rafters in house building, for piles, and

for telegraph poles. It is well adapted to the latter purpose on account of its small cost and great durability. Handsome canes are made from the hard outer wood, and the natives often fashion bows from it.

150. Palo-maria, or Bitanjol, or Bitanhol (*Callophyllum inophyllum*, D. C.)—Tree of moderate size; wood, light red; of fibrous texture, with large pores. It breaks in long splinters. The shaving is rough and strongly curled. The tree is said to acquire gigantic proportions in Mindanao. The wood is exceedingly tough, and, as it often has good crooks, is much used for shipbuilding, though in the northern islands it can seldom be obtained in pieces of suitable size for large vessels. It is lighter than Molave, and does not corrode iron bolts as does that wood. It is said to produce "tar," oil, and an excellent balsam for curing wounds.

151. Palo napay.—Wood violet red with blackish spots. Texture compact, fine-grained and fibrous. Pores inconspicuous. It gives off a mild odor of tanned leather. It is somewhat employed for building purposes. It is hardly known in the Manila market and is not exported. Nevertheless, it is a wood which is not to be despised, and might prove valuable.

152. Palsaguynguin.—A grayish-yellow wood of medium weight.

153. Palusapis.—A light wood of dark straw color.

154. Panao.—A light grayish-yellow wood.

155. Panguisan.—The wood is of an ashy yellow color, moderately porous and not very durable. It is somewhat used for building purposes.

156. Panaybanay (*Plerospernum* sp.).—A very heavy wood of grayish-brown color.

157. Panosilo.—The wood known by this name is of a yellowish-white color and of somewhat fibrous texture, with large and numerous pores. It is not very beautiful, nor is it much used. It is not ordinarily to be met with in the Manila market and is not exported.

158. Pasac (*Mimosops erythroxylon* Bos.).—Tree large; wood hard, tough, and durable, of reddish-white or flesh-red color. Texture varies from fibrous to quite compact; pores plainly visible; it gives off no odor and breaks square across. It is employed for building purposes like yacal, to which wood it is, however, inferior. This wood is more and more used as the time goes by, and is increasing in value.

159. Pasquit (*Memecylon paniculatum* Jack.).—A heavy wood of reddish color.

160. Pili (*Canarium* sp.).—A straw-colored wood of medium weight.

161. Pino or palo pino (*Pinus insularis* Endl.).—Tree very large; in the mountains of Ilocos, Lepanto, and Benguet specimens of tremendous size are seen; wood very resinous. The wood is not to be found in the Manila market nor is it exported. The tree is very abundant in the mountains of north Luzon, and it is said that the gathering of its resin would be profitable.

162. Puso puso (*Litsea littoralis* Benth.).—A reddish-yellow wood of medium weight.

163. Putat (*Barringtonia racemosa* Bl.).—A white wood of medium weight.

164. Putotan or pototan.—A reddish-brown wood of medium weight.

165. Sampoc (*Tamarindus indica* L.).—The tamarind. It acquires a great growth in the Philippines, and its roots are used for carpenter's work.

166. Santol or santor (*Sandoricum indicum* Cav.).—The tree attains

a height of 12 meters, with a diameter of 1 meter. Its wood is reddish and of strong texture, with undulating grain and with the pores but slightly visible. It breaks into short splinters and gives a delicate and somewhat curling shaving. It is little employed for building purposes and is not exported to any considerable extent.

167. Sibucao or palo-sapang (*Cesalpinia sappana*).—An orange-red wood of fine and fibrous texture, with pores of moderate size. Pegs made from it are used in the manufacture of small sailing craft in place of iron spikes and nails. It produces a red coloring matter, similar to logwood, which is used for dyeing wool and cotton. This substance is most abundant in the small branches, which are exported in considerable quantities. The wood is useless for building purposes.

168. Sirique.—A grayish-yellow wood of medium weight.

169. Solipa or sulipa (*Sulipa pseudopsidium* Bl.).—The so-called "false guava" is a tree of small size which abounds in some provinces of Luzon. Its wood is a canary yellow or greenish yellow. It is of fibrous texture, with numerous and conspicuous pores. It has no odor. It breaks in long splinters. It is employed for cooper's work, but is little used for building purposes.

170. Supa (*Dipterocarpus* sp.).—Tree of large size; wood yellowish or dirty ocher, becoming brownish yellow in time. It sometimes shows reddish tints. It is very similar to ipil and is employed in place of the latter wood for house and ship building, but is, nevertheless, considerably inferior to it. Persons buying lumber should familiarize themselves with this wood in order to avoid fraud.

171. Tabigui-itim.—A heavy wood of deep-red color.

172. Taboc (*Ægle decandra* Naves).—A heavy white wood.

173. Talisay (*Terminalia catappa*).—A dark straw-colored wood of medium weight.

174. Tamauyan-puti (*Gymnosporia* sp.).—A light white wood.

175. Tangile or tangili or tanguili (*Dipterocarpus polyspermus* Bl.)—Tree of large size; wood brownish red and of very fine texture, but with large and numerous pores. It breaks squarely across. It is much used for the construction of canoes and also for joiner's work.

176. Tangisan (*Ficus* sp.).—A white wood of medium weight.

177. Tapal.—A very heavy wood, with black and white stripes.

178. Teca (*Tectona grandis* L.).—The teak, which constitutes one of the principal sources of wealth in the Indian forests, exists in the Philippines, but is little known. It has been observed in Mindanao and is said to exist in Negros.

179. Tibayos or tubayos.—A heavy slate-colored wood.

180. Tibig (*Ficus glomerala* Blanco).—A white wood of medium weight.

181. Tinaan pantay.—A light-gray wood of medium weight.

182. Tindalo (*Eperua rhomboidea* Bl.).—Tree of large size; wood of light red, shading to dark red when freshly cut. It grows darker with age and in time becomes almost completely black. Sometimes the color is uniform, sometimes it shows darker streaks and spots. The wood is of solid texture and somewhat cross-grained. It gives a rough shaving, very porous, and not curled. It is used for house decoration and the manufacture of fine furniture; occasionally also for building, but not much, as it is difficult to get pieces of suitable size. It is somewhat brittle and takes a high polish.

183. Tingan-tingan (*Pterospermum obliquum* Blanco).—A dark straw-colored wood of medium weight.

184. Toob (*Bischofia javanica* Mull. Arg.).—A light-gray wood of medium weight.

185. Tooc or toog.—A heavy dark-red wood.

186. Tucangcalo (*Sterculia rubiginosa* Vent. Hook.).—A heavy dark-red wood.

187. Yacal or saplungan (*Dipterocarpus plagatus* Bl.).—The trunk of this tree reaches a height of 40 to 60 feet, with a diameter of 2 to 3 feet. It gives logs up to 50 feet long by 22 inches square. It is of an earthy-yellow color and of solid and fine texture. It breaks in long splinters and gives a delicate shaving closely curled. It is proof against white ants and has great strength and tenacity. It is much used in house building as well as in shipbuilding. It is one of the heaviest and most enduring of the Philippine woods.

USES OF THE MORE IMPORTANT WOODS.

The more important and better known of the woods enumerated in the foregoing list may be grouped according to the uses to which they are especially adapted, as follows:

FOR CABINETWORK.

Ebano, Camagon, Bolongita, Tindalo, Narra, Malatapay, Alintatao, and Camuning, for fine furniture.

Lanete, Narra blanca, Lanutan, Malarujat, Batitinan, and Antipolo, for common furniture.

FOR SHIPBUILDING.

Yacal, Betis, Dungon, and Ipil, for keels and sternposts.
Antipolo, for keels and outside planking.
Molave, for futtock timbers, stems, crooks for framework.
Banaba, for outside planking, beams.
Guijo, for beams, masts, and yards.
Batitinan, for keelsons, clamps.
Mangachapuy, for waterways, deck timbers.
Amuguis, for upper works, partitions.
Palo-maria, for futtock timbers, masts and yards.
The last-mentioned wood does not last well.

FOR CANOES.

Tangile, lauaan, malaanonang, balao, mayapis, and many other woods not so well-known.

FOR HOUSE BUILDING.

Molave, for beams, framework, doorcasings, window casings, floor boards, etc.

Ipil, same as molave.

Supa and balao are substitutes for ipil, but very inferior to it.

Dungon, for rafters, door and window jambs, clamps, etc. In general for all parts that are required to afford great resistance and do not involve much shaping.

Banaba, employed for various purposes. Excellent for all parts exposed to the action of moisture, which it resists excellently.

Yacal, excellent for framework.

Amuguis, baticulin, and malatumbaga, used in form of boards for partitions, ceiling work, etc.

FOR BOX MAKING.

Calantas, for cigar boxes and fine boxes in general.

Tangile, mayapis, and malaanonang, for common boxes.

There are also many other woods suitable for box making and similar work on account of their abundance and the ease with which they are sawed.

The more important Philippine woods arranged according to weight.

Name.	Weight per cubic inch.	Specific gravity. *a*	Name.	Weight per cubic inch.	Specific gravity. *a*
	Grams.			*Grams.*	
Ebano	13.2	1.153	Calumpit	8.550	0.666
Camagon	13.2	1.153	Malatalan	8.290	.662
Yacal	12.79	.925	Calamansanay	9.630	.643
Pagatpat	12.15	.898	Malarujat	8.240	.641
Anusep	.....	.870	Narra	8.240	.634 (?)
Manicnic	11.50	.861	Apiton	7.565	.615
Dungon	11.449	.833	Pino	7.250	.606
Molave	10.499	.819	Tangile	7.590	.603
Teca	10.75	.816	Antipolo	7.590	.593
Tindalo	10.749	.809	Anubiong	6.990	.593
Bolangita	9.829	.789	Malacadius	7.590	.580
Camayuan	9.260	.788	Nato	7.540	.579
Ipil	10.510	.785	Palo-maria	7.290	.571
Pasac	10.150	.785 (?)	Palo-napuy	7.340	.571
Lanutan	10.499	.784	Calantas	7.374	.563
Banaba	10.099	.776	Amuguis	7.414	.538
Cubi	7.540	.581	Bancal	6.734	.521
Culing-manoc	9.939	.773	Mayapis	6.839	.511 (?)
Mangachapuy	9.665	.766	Baticuling	6.690	.500
Calumpang	11.185 (?)	.765	Lanete	6.585	.495
Panguisan	9.829	.745	Anagap	6.389	.486
Betis	8.015	.719	Santol	5.459	.470
Acle	9.290	.709 (?)	Marang	5.990	.465
Guijo	9.730	.685	Sulipa	5.240	.419
Macasin	8.780	.683	Balao	5.090	.393
Bansalagui	9.280	.676			

a Should be reckoned over. Vidal's table evidently full of mistakes.

The more important woods arranged according to elasticity.

Name.	Elasticity.	Name.	Elasticity.
Calantas	0.0075	Guijo	0.0035
Solipa	.0072	Palonapuy	.0035
Antipolo	.0070	Tindalo	.0034
Lanete	.0068	Cubi	.0034
Anagap	.0060	Yacal	.0032
Macasin	.0052	Camayuan	.0032
Baticulin	.0050	Santol	.0032
Apiton	.0050	Bolongita	.0030
Amuguis	.0050	Dongon	.0030
Bancal	.0050	Mangachapuy	.0030
Anubiong	.0050	Nato	.0030
Marang	.0048	Teca	.0028
Calumpang	.0046	Malacadius	.0028
Malarujat	.0046	Panguisan	.0028
Calumpit	.0044	Pino	.0028
Banaba	.0040	Betis	.0026
Anusip	.0040	Mayapis	.0026
Malatalan	.0040	Ipil	.0024
Manicnic	.0040	Ebano	.0022
Acle	.0040	Camagon	.0022
Calamansanay	.0037	Bansalagui	.0020
Narra	.0037	Culing-manoc	.0020
Balao	.0037	Lanutan	.0020
Molave	.0035	Pagatpat	.0014

The more important woods arranged according to power of resistance.

Name.	Weight required to break.	Name.	Weight required to break.
	Kilograms.		*Kilograms.*
Pagatpat	63.263	Mangachapuy	33.127
Bansalagui	58.087	Lanutan	32.667
Yacal	54.981	Bancal	31.804
Culing-maloc	46.699	Betis	31.718
Manicnic	46.009	Balao	31.545
Ipil	44.658	Malatalan	31.286
Molave	41.552	Nato	31.286
Narra	41.523	Banaba	29.820
Cubi	41.237	Tangile	29.676
Guijo	40.747	Macasin	28.526
Acle	40.594	Malarujat	27.375
Ebano	40.028	Pasac	27.145
Camagon	40.028	Mayapis	26.915
Tindalo	39.539	Lanete	26.829
Calamansanay	38.522	Santol	26.312
Anusip	36.938	Anubiong	25.765
Pino	36.347	Malacadius	24.845
Palonapuy	36.369	Anagat	23.465
Palo-maria	35.586	Calumpit	22.602
Panguisan	35.427	Apiton	21.624
Camayuan	35.341	Baticulin	21.394
Dungon	35.140	Calantas	21.222
Bolongita	34.967	Marang	20.705
Calumpang	34.679	Sulipa	12.422
Antipolo	34.235		

PAPER NO. VII.

ZOOGRAPHY.

ZOOGRAPHY.

INTRODUCTION.

Although the zoology of the Philippine Islands has been more studied than have their botany and geology, still the work may be said to have only been fairly begun, even in the case of those groups of animals which have been most carefully investigated. In general it may be said that the Philippines are characterized by a scarcity of mammals, by a rich bird fauna, which includes a very high percentage of species peculiar to the group, and by the enormous abundance and great variety of the land mollusca. The distribution of the mammals and birds within the limits of the archipelago is a most interesting study, which has already thrown much light on the probable past geological history of the group. The study of zoography in the Philippines is, however, as yet in its infancy. The results thus far reached will be briefly discussed under the chapters devoted to mammals and birds.

In general it may be said that the Philippines politically speaking, and the Philippines zoologically speaking, are not identical areas, for Balabac, Palawan, and the Calimianes islands are strongly characterized by the presence of numerous Bornean forms which are conspicuously absent throughout the remaining islands of the archipelago. Although the Philippines are commonly held to form an eastern extension of the Indo-Malayan subregion, it should not be forgotten that at least among the birds and mammals there is a large amount of specialization in the islands to the eastward of the Baladac-Palawan-Calimianes group.

It is not our purpose to enter into a detailed discussion of the zoology of the Philippines, and we shall content ourselves with briefly mentioning a few of the more important or interesting forms in the various groups.

MAMMALS.

As already stated, the Philippines are very poor in mammals; and this fact is the more surprising when one compares them with the neighboring island of Borneo in this respect. They are undoubtedly well adapted to a large and diversified mammalian fauna, and the only plausible explanation of the scarcity of forms is to suppose either that they have never been connected with Borneo and the Asiatic continent or that, if at one time connected, they have since been subjected to such subsidence as to wipe out the greater part of their mammalian fauna.

Apparently, however, there has been a comparatively recent connection of short duration between the Calamianes Islands, Palawan, Balabec, and Borneo. This would account for the strong Bornean character so plainly to be noted in the mammals of these islands.

There are no marsupials in the group. The edentate, or toothless mammals, are represented by the pangalin (Manis sp. ?), which is abundant in Palawan and the Calamianes group. This curious animal, known to the natives as balington, has its whole dorsal region protected by thick scales, and when molested rolls itself up into a ball. It feeds at night, living largely on ants, which it licks up with its long protrusible sticky tongue.

In the seas of the archipelago we have the dolphin; the cacholet, from which spermaceti is obtained; whales, and, finally, the dugong, or, as the natives call it, woman fish. Beads are made from its tusks. This animal is said to be constantly growing scarcer in the Philippines.

The horses which exist in the Philippines were imported from Mexico, China, or Borneo. They are of small size, but well formed and tough. Little care has been exercised in breeding them, and they might doubtless be greatly improved. Neither Australian nor European horses have thus far done well in the Philippines. It is said that the grass, which is somewhat harsh, gives them intestinal trouble, and that the great moisture during the wet season causes foot disease. Good results have been obtained with American cavalry horses by feeding them young rice leaves or imported hay.

Wild hogs of at least two species occur in the Philippines. In some of the islands, notably Tawi-tawi, they are extremely numerous, and they often cause the natives no little trouble and loss by destroying their crops at night. They are much hunted, both on this account and for the sake of their flesh, which is excellent. The boars sometimes attain to immense size, and hunting them is by no means unattended with danger. In Tawi-tawi, during the season when the dureian tree ripens its fruit, the wild hogs become so fat that the natives insist they die of heat when hard pressed by dogs.

The curious babyrusa of Celebes has been said to occur also in Mindanao, but this statement is probably incorrect.

Domesticated hogs of black color are to be found in numbers in every native village. They cross more or less freely with the wild species. Few white men who have observed their habits care to eat their flesh.

Deer are extremely abundant in many parts of the archipelago, and their flesh, like that of the wild hog, forms an important article of food for the natives, while their skins and horns are put to various practical uses. In Sulu there is a beautiful axis deer, which has almost certainly been introduced there by man. Neither this nor any other species occurs on the island of Tawi-tawi. In Basilan, Mindanao, Leyte, Samar, Luzon, Mindoro, and the Calamianes Islands there are deer of red or brown colors, without spots when adult. The exact number of species and their respective ranges have never been satisfactorily determined.

Finally, in Masbate, Panay, Guimaras, and Negros there is a beautiful dark-colored deer, marked throughout life with buff spots.

Sheep and goats have been imported into the islands from China and Mexico. The goats do well, but the sheep do not. It is said, however, that experiments made with them in the highlands of Benguet have sulted very successfully.

THE CARABAO, OR WATER BUFFALO.

PLATE II.

CARABAOS GRAZING.

Humped cattle are raised on most of the islands, notably in Masbate, the Calamianes group, and some of the small islands north of Luzon. They are killed for their flesh, hides, and horns, and little attention is paid to milk-giving properties. Australian cattle have been brought to Manila from time to time, but have suffered greatly from disease. The establishment of good modern dairies, within easy reach of Manila and other large cities, would seem to be likely to prove a practicable and remunerative enterprise. At present cows' milk is difficult to obtain, while cream, fresh butter, and pressed cheese can not be had at any price.

The most important domesticated mammal in the Philippines is the water buffalo, or carabao. It occurs wild in Luzon, Mindoro, the Calamianes Islands, Masbate, Negros, and Mindanao, and probably also in other islands of the group, but it is believed that the wild herds have originated from domesticated animals which escaped after being imported into the islands. It is said that Mindoro herds sometimes number as many as 200. Although bullocks are sometimes used as draft animals, the carabao is par excellence the beast of burden in the Philippines. They are tolerably strong, but are sluggish in their movements, and can not long endure the heat of the tropical sun when at work. If one forces them on they are likely to lie down in the first puddle or stream encountered, and refuse to get up. If pushed too hard, they die of the heat, and in cases of emergency water should at least be poured over their heads and along their backs from time to time. If left to themselves they will pass the greater part of the day in a mud bath.

They are wonderful swimmers, and do not hesitate to cross 10 miles of open sea. When feeding in the water, they frequently submerge their heads for some time in order to get at the roots of water plants. it seems impossible to mire them, and on this account they are extremely useful during the rainy season. They breed freely, but are frequently swept off in great numbers by epidemics of disease. They are often tended and driven by small children, who clamber up their hind quarters on to their backs, supporting themselves meanwhile by hanging on to their tails. In spite of their apparant gentleness they have been known to attack and kill their masters, and in the more remote towns they sometimes display a violent dislike for white men, occasionally stampeding at the mere smell of one. Their flesh is eaten by the natives, but is tough, stringy, and rather tasteless. Their hides and horns are put to various uses. The natives believe that pieces of burned buffalo horn will cure snake bite.

Hunting the wild buffaloes is a much more exciting and dangerous sport than one would expect. When wounded they charge home viciously, and if they once get into close quarters it is all up with the hunter. They have been repeatedly known to kill men after being shot through the heart. In hunting them the natives sometimes use trained tame buffaloes as decoys. Success can be hoped for only at night. The tame animal feeds along, slowly approaching the wild one up the wind, and the hunter creeps along in his shadow. When close alongside of his victim he slips round behind him, and attempts to hamstring him with two blows of his bolo. If he fails, his carelessness is apt to cost him his life. In the Calamianes Islands long fences are sometimes constructed, gradually running together and leading into a pen, and drives are held which sometimes result in the capture of

considerable numbers of buffalo. The younger ones are readily domesticated; the older ones are sometimes brought to subjection by the cruel method of tying them up and leaving them without food or water until they are completely exhausted and nearly starved.

By all odds the most interesting mammal in the Philippines is a small island buffalo, called by the natives timarru, peculiar to the island of Mindoro. In color it resembles the water buffalo, but it is very much smaller than that animal. Its short, strong, and sharply pointed horns run almost directly backward, somewhat like those of an antelope. Unlike the carabao, it never bathes in the water or wallows in the mud. It sleeps during the day, hidden away in the densest jungle. At night it comes forth to feed, and some time before morning visits a neighboring water course in order to drink. Hunting it is both difficult and dangerous, so much so, in fact, that it is only within a few years that a series of specimens has been obtained for scientific investigation. One must pick up a trail along some water course and follow it as best he may. The timarru is short legged, and in going through the forests it puts its nose close to the ground and burrows under the creepers and dense vegetation which slip along its horns and back and snap down behind it, leaving no passageway at all. In following such a trail one is frequently compelled to work his way along flat on his belly, and at the best will frequently have to go for half an hour at a time on all fours. The timarru's senses of hearing and smell are exceptionally acute, and the snapping of a dry twig or a puff of wind in the wrong direction often make half a day of killing work useless. When the animal has once been alarmed one might as well abandon the trail, for it will often run 10 miles without stopping, tearing its way through the forest, and exhibiting an amount of brute strength utterly out of proportion to its small size.

Before lying down to sleep the timarru usually turns about and faces its own trail. The hunter must creep up within 30 or 40 feet of his game before he can see it, and he must then shoot for the brain. The timarru is almost certain to charge if not instantly killed, and at such short range there is little time for a second shot. When hit through the lungs it will run for miles, and it will often go 75 to 100 yards after being shot through the heart.

It is ordinarily met with singly, although it is said to go in herds in the tall grass on the west coast of Mindoro. Fierce battles often occur between the bulls, and in spite of their inferior size they attack and sometimes kill the wild water buffaloes. The natives are much afraid of them, and not without reason. Repeated attempts at domesticating them have ended in failure. When taken in snares or pitfalls they struggle until they kill themselves, and young calves, with horn just starting, when put to suck to female carabaos are said to have attempted to attack them and afterwards to have refused all food.

According to the English naturalist, Mr. John Whitehead, the timarru forsakes the wet lowlands for the mountains during the rainy season.

This curious animal presents a zoological puzzle. Its extinction by man would be well-nigh impossible so long as a bit of jungle remained on an island; yet it is not found in Luzon, which at one point is distant but 10 miles from Mindoro, nor does it exist in any other island of the archipelago. It has been classified as *Bubalus mindorensis* Haude, but it is doubtful if this determination is correct. The Ger-

CARABAOS TAKING A BATH.

man collector, Dr. Platen, who had successfully hunted the anoa of Celebes, and who secured four or five specimens of the timarru in Mindoro, insisted that the two animals were identical.

Elephants were at one time imported into Sulu, and, it is said, into Cebu also. It is said that they proved a nuisance, and were therefore killed. None exist in the archipelago at present.

Domesticated rabbits occur in the islands, but there are no wild ones.

One species of porcupine occurs, but it is confined to the Palawan-Calamianes group.

The house rat, which has been introduced by man, is a common nuisance. There are a number of wild species of rats and mice, some of which occasionally become so numerous as to seriously damage the sugar cane and rice fields.

Squirrels occur in the eastern chain of islands from Luzon to Basilan and in the Palawan-Calamianes group. In the southern islands there is a tiny species the size of a mouse. Very large flying squirrels are found in Palawan and Mindanao. They are nocturnal in their habits. There are no squirrels in Cebu, Negros, Panay, Masbate, or Mindoro.

Squirrel-shrews occur in the Palawan-Calamianes group, and true shrews at various points in the archipelago.

Among carnivorous animals may be mentioned the bintorang and a species of otter, both found in the Palawan-Calamianes group. Also two species of civet cats which range throughout the group, and a true wild-cat of small size which has been found in Palawan, Panay, and Negros, and is said to exist in Cebu.

Bats occur in great numbers, and there are very numerous species, a number of which are peculiar to the archipelago. There are extensive bat caves in Guimaras, Cebu, and Siquijor. The deposits in these caves have never been worked, but would doubtless be of considerable commercial value. At numerous points in the archipelago there are immense colonies of the large fruit bats, which pass the day hanging head downward in their favorite trees, which they frequent in such numbers as to fairly blacken them. At dusk they may be seen rising in a great swirling column high into the air, and then setting off in different directions to search for food. Their skins have been somewhat used for furs.

The prosimidæ are represented by *Galeopithecus philippinensis* Wath. (the so-called flying lemur), the tarsier (*Tarsius spectrum* Geoff.), and a small lemur (*Nycticebus tardigradus* Fisch.). The latter animal occurs only in Tawi-tawi. It is known to the natives as kokam and to the Spaniards as el virgonzoso, on account of its curious habit of hiding its head when approached by man and unable to escape.

Galeopithecus is found from Basilan to Luzon, and also in the island of Bohol. It has membranes like those of a flying squirrel, which not only extend between the legs but reach to the tip of the tail. By the aid of them it is able to make immense leaps through the air, pitching down sharply at first and rising again as it approaches the tree on which it desires to alight. It is nocturnal in its habits. Its soft fur is highly prized in Europe.

So far as is at present known the tarsier, a most curious little mammal, is confined to Basilan, Mindanao, Samar, Leyte, and Luzon. Its characteristics are perhaps too well known to require description. The natives in the Philippines insists that it feeds on charcoal, and this curious belief occurs among the natives of some other regions where it is found.

In spite of all that has been said to the contrary, but a single species of monkey has as yet been discovered in the Philippine Islands. It is known to the natives as maching, or matsin, and its scientific name is *Macacus philippinensis* Geoff. It is of medium size, and occurs on every island of any importance in the group. It is very commonly tamed by the natives, who use it to rid their heads of objectionable tenants. It not infrequently inflicts considerable damage on growing rice and other crops. Its flesh is sometimes utilized by the natives as an article of food.

A black monkey (*Cynocephalus niger* Desm.), of Celebes, has been said also to occur in Sulu and Mindanao. It is undoubtedly sometimes brought to Sulu from Celebes, but there is no reason for believing that it occurs wild, either in that island or in Mindanao. The various other species of monkey which have been assigned to the Philippines by different authors are myths pure and simple.

BIRDS.

No other group of organisms has been so thoroughly studied in the Philippine Islands as have the birds, which early attracted the attention of naturalists, beginning with Sonnerat. Since his day Cuming, Meyer, Steere, Everett, Platen, Moseley, Bourns, Worcester, Whitehead, and others have contributed more or less extensively to our knowledge of the avifauna of the archipelago. The result has been to raise the total number of species to more than 590,[1] of which at least 325 are peculiar to the Philippines.

With few exceptions, these peculiar species are land birds, and the study of their distribution has brought out some interesting facts. Certain islands, or groups of islands, have been found to have characteristic forms of their own which do not spread to other islands of the group. Thus, the Balabac-Palawan-Calamianes islands have several peculiar species, and the bird fauna of this region, on the whole, agrees with the mammalian fauna in showing strong evidences of a Bornean origin.

The deep water between the Calamianes group and Mindoro marks the northern extension of these Bornean forms into the Philippine group. None of them reach the latter island, which has 11 peculiar species of its own; although, as might be expected, a number of the characteristic forms have made their way across the few intervening miles of sea, aided, no doubt, by Isla Verde and other small islands. Many of the most important Luzon forms are absent, however, and these facts, together with the occurrence of the remarkable timarru and the absence of most of the characteristic Luzon mammals, combine to give Mindoro a place by itself.

As might be expected, the great island of Luzon, with its high mountains and mighty forests, its extensive open plains, its important fresh-water lakes and large rivers, has a very rich bird fauna, and it has been more carefully studied than has that of any other island in the archipelago. Two hundred and eighty-six species of birds have been recorded, of which 136 are peculiar to the Philippines, and 51 are not known to occur outside of Luzon and the small islands immediately adjacent to it.

[1] In 1897 the number recorded was . Some additions have since been made.

PLATE IV.

CARABAO TAKING A MUD BATH.

A close relationship has been shown to exist between the eastern islands from Luzon to Basilan. The greatest differences occur between Luzon, on the one hand, and Samar-Leyte and Panaon on the other. The latter group of islands form a well-defined zoological area characterized by the presence of 22 peculiar species; and while no less than 63 Luzon forms have not as yet been found in Samar, we find practical agreement between the families occurring throughout the eastern chain of islands, while many important and highly characteristic genera not represented in the central Philippines range from Basilan or Mindanao to Luzon, often with different representative species in the different zoological areas into which the islands in question must be divided.

Mindanao is, next to Luzon, the largest island in the Philippines, and, like the latter island, has a diversified surface, with high mountains, extensive forests, and open plains. Much doubtless remains to be done before the study of the birds of this island will have been completed, and its highland avifauna is as yet quite unknown. Two hundred and seven species of birds have thus far been found on the island.

The small island of Basilan probably once formed an extension of the peninsula, which at present ends at Zamboanga. There are 17 species of birds peculiar to Mindanao and Basilan, while 13 more occur in these islands and range to the northward, but do not extend into the Sulu-Tawitawi group. Apparently, however, the separation between Mindanao and Basilan has endured for a considerable time, as 5 peculiar species have been developed in the latter island and 8 in the former, while a number of species closely allied to or identical with Samar-Leyte forms occur in Mindanao which are absent in Basilan, apparently indicating a relatively recent connection between the former islands and those lying to the northward. With but a single exception every one of the peculiar Samar-Leyte species is known to have a close ally of the same genus in Mindanao.

It is only within a few years that the birds and mammals of the Sulu-Tawitawi group have been investigated. The result has been to show conclusively that these islands belong to the Philippines zoologically as well as politically. Bornean forms are conspicuous by their absence, the mammals of that island being represented only by a lemur, and the birds by a few unimportant forms; while 53 characteristic Philippine species have been accorded from Sulu and 51 from Tawitawi. This group has 12 well-marked peculiar species of its own, and many of the characteristic Mindanao-Basilan forms are lacking, so that it forms a well-marked area by itself.

It only remains to discuss the central islands of the archipelago. Panay, Guimaras, Negros, and Masbate have been shown to constitute another sharply defined area characterized not only by the occurrence of 30 peculiar species of birds, but by the absence of important genera and even whole families which are represented in the eastern chain of islands.

As previously stated, they also lack most of the mammals characteristic of the region last referred to. They have no squirrels, and Galeopithicecus tarsius and pteromys do not occur. The wild-cat of the central Philippines is not known to occur in the eastern islands, and a very well marked species of deer is peculiar to the former group.

Curiously enough, the island of Cebu stands by itself, although the greatest width of the channel separating it from Negros is hardly more

than 20 miles, while at one point it narrows to 4. It is very deep, however, and has doubtless long existed. As a result, Cebu possesses no less than nine striking species of birds not known to exist elsewhere in the world, and lacks not only important genera, but even whole families, which are represented in the Panay-Negros-Masbate group.

The zoological position of Bohol has never been satisfactorily determined, as naturalists who have attempted to work there have not succeeded in finding good forest land. Such facts as have been ascertained indicate that this island should be grouped with Samar and Leyte, a fact rendered the more probable by the line of shallow soundings which connects it with the latter island.

Interesting results have been obtained from the study of the birds of small islands like Siquijor, Tablas, Romblon, and Sibuyan, but they can not well be here discussed.

Should it be thought that the facts as regards the geographical distribution of birds and mammals within the Philippine group are of small importance, it may be replied that they throw important light on the past geological history of the group.

The land birds are not driven from north to south, and from south to north again by changing seasons, as happens in our own country, and a comparatively small expanse of salt water forms a barrier which many of them can not or will not cross, while it effectually checks the migration of many of the mammals. The degree of difference between the birds and mammals of the natural zoological areas into which the islands of the Philippine Archipelago fall may therefore be taken as a fair index of the duration and completeness of the separation which has existed between them.

Much still remains to be done in the study of the birds and mammals of the archipelago. The connection with Formosa on the north has never been worked out, while that with Celebes on the south has been studied incompletely. The highlands of many of the larger islands of the group are still nearly or quite unexplored, and many of the smaller islands are as yet wholly unknown. It is probably safe to say that nowhere else in the world does nature offer a more favorable opportunity for the study of the vexed question as to the relationship between environment and species formation in the case of the higher animal.

The islands abound in beautiful birds, as well as in species which are interesting on account of their peculiar habits, while a number of forms are in one way and another of considerable importance to man. Only a few of these can here be mentioned. It should be said in passing that the statements which have appeared to the effect that birds of paradise, humming birds, and the lyre bird, occur in the Philippines are utterly without foundation. Instead of humming birds we have sun birds, conspicuous for their beautiful colors, and feeding from flowers, as do the hummers, but quite without their remarkable powers of flight.

Among the most remarkable birds of the group are the mound builders (*Megapodius cumingi* Dillwyn), known to the natives as tabón. These singular birds burrow into the sand along the sea beach, or the soft earth of the forest, and deposit their eggs, which are very large and out of all proportion to the size of the birds, 2 or 3 feet below the surface of the ground. The eggs are very rich in yolk, and the little

birds are highly developed when they hatch. They dig their way to the surface, take to the brush, and shift for themselves from the day of their birth. A number of pairs often frequent the same spot, to which they constantly return. Each time an egg is deposited the parent birds scratch dirt over the place, and a mound of steadily increasing size is thus formed, which sometimes attains to a diameter of 12 or 15 feet and a height of 4 or 5. The eggs of the tabón are highly prized by the natives as an article of food, and they sometimes impose on the unfortunate bird by digging away the top of a mound, covering the base with boards, and then heaping soft earth on them again so that after several ineffectual attempts to burrow to the bottom the birds lay their eggs on the boards, thus saving labor for those who wish to rob them.

The jungle fowl (*Gallus gallus* Linn.) abounds throughout the archipelago. This fowl is presumably the ancestor of our domestic breeds, and the cocks and hens somewhat closely resemble red leghorns. They are not infrequently caught and domesticated, and the cocks are even trained to fight. They cross freely with the domestic fowls of the Philippines. The cocks are extremely pugnacious, and the natives obtain them in considerable numbers by the use of individuals that have been tamed as decoys. The tame cock is staked out in the brush, and its owner secretes himself. The crow of the decoy bird is promptly answered by that of the lord of the territory thus invaded, who promptly appears to punish him for his audacity, and is thereupon laid low by the concealed hunter.

This method of procedure is often varied by surrounding the decoy bird with a circle of snares, so that when his wild rival appears to find him he becomes entangled and can not escape.

There are no less than 35 species of pigeons and doves known to inhabit the Philippines; many of them are most beautifully colored, and the flesh of all of them is edible. Several of the species are of very large size. This is notably the case with the six representatives of the genus Carpophaga, which are collectively known to the natives as balud. The splendid Nicobar pigeon (Calœnas nicobraica Linn.) is especially worthy of mention on account of its beautiful changeable hues, which vary from deep green to fiery copper red. There are 15 species of rails, coots, and gallinules. The natives often eat their flesh and sometimes their eggs as well. Gulls and terns are poorly represented.

Snipe, plover, turnstones, and shore birds in general are very abundant along the coast during the cold season in Asia, but the majority of the species migrate northward with the oncoming of the hot season. The Asiatic snipe makes splendid shooting in November, December, and January, and the beautiful painted snipe is resident in the islands throughout the year.

The herons and bitterns are represented by 15 species of the most varied forms, size, and color. There is but one stork, and it is comparatively rare.

Five species of ducks are recorded from the islands. One of these, a fine mallard, is peculiar to the Philippines, and this species, as well as *Dendrocycna arcuata* (Cuv.) often affords fine shooting. The latter species breeds abundantly, and its eggs are often used by the natives for food. The birds of prey number no less than 45 species, of which 22 are peculiar to the Philippines. In size they vary from a tiny falcon

(*Micro hierax*), the size of a sparrow, up to the immense monkey-catching harpy eagle (*Pithecophaga jefferyi*, Grant), which is so strong and active that it seizes monkeys as they leap from tree to tree. It is one of the most difficult of birds to kill, and thus far but two specimens of it have been secured. The first was obtained by the Menage expedition near Cathaloban, Samar, in 1892. The second was secured by the English naturalist, Mr. John Whitehead, several years later.

Another family well represented is the kingfishers. Of these there are 21 species, all but six of which are confined to the Philippines. Many of these are most beautifully colored, and not a few of them feed on insects, larvæ, etc., in the forests, never "fishing" at all.

There are 12 species of hornbills, not one of which occurs outside of the Philippines. These birds have most singular breeding habits, the males wall up the females in hollow trees when the latter are ready to attend to their maternal duties, by filling up the openings through which they enter with clay, leaving only small holes through which they can pass in food to their imprisoned wives. The hornbills are fruit eaters, and their flesh is excellent. The large species of the genus Hydrocorax frequent very high trees, but can readily be called down within range if one hides one's self and imitates harsh notes.

There are a variety of frogmouths, bee birds, night hawks, and swifts. One of the latter (*Collocalia troglodytes*, Gray) is especially interesting, since it constructs the edible nests so highly prized by the Chinese for food. These nests, which are composed of a gelatinous secretion from salivary glands in the mouths of the birds, are usually placed in the hollow of steep cliffs or in limestone caves. When quite fresh and clean they sometimes bring more than their weight in gold. The best nests are obtained on the precipitous sides of the Peñon de Coron, between Culion and Busuanga, where the natives gather them at no little personal risk. Good nests are to be had in Guimaras, Siquijor, and at other points. When persistently robbed the birds help out their stock of secretion by using bits of moss, grass, etc., and it is perhaps this fact which has given rise to the more or less widespread belief that their nests are made of "sea moss."

Among the remaining forms there may be mentioned 21 species of cuckoos, 1 cockatoo, 19 parrots and paroquets, 19 woodpeckers, barbets, broadbills, starlings, orioles, weaver finches, larks, nuthatches, 24 species of beautifully colored sun birds, and 23 of flower peckers, titmice, shrikes and swallow shrikes, tailor birds, thrushes, fruit thrushes, fairy bluebirds, firebirds, 42 flycatchers, 4 swallows, and 5 species of most beautifully colored pittas, or ant thrushes, as well as a large number of birds belonging to the Timeliidæ, and several other families for which English names can not readily be supplied.

The breeding habits of the tailor bird are particularly worthy of note. There are nine species of the genus Orthotomus in the Philippines. So far as their breeding habits are known, they all stitch together green leaves by piercing their edges with their long, slender beaks and passing thread obtained from spider webs, cocoons, or other sources back and forth through the holes thus made. As the leaves remain attached to the branches and are in no wise injured by this process, they form a green sack, within which the nest is so perfectly concealed that it is almost impossible to discover it. Although the birds are excessively common, their nests are extremely difficult to obtain.

REPTILES AND BATRACHIANS.

The reptiles and batrachians of the Philippine Islands have been but little studied; nevertheless a large number of forms is known, of which we shall mention only a few of the more important.

The largest snake in the archipelago is the python, known to the natives as sauá. It is not uncommon to see immature specimens offered for sale in the larger towns, where they are put in storehouses and over the ceilings of rooms in dwelling houses in order that they may keep down the pest of rats. As they grow larger they prey upon chickens and pigs, and individual specimens which have developed a taste in this direction often cause much annoyance in the native villages.

In the forests of the archipelago they sometimes attain to enormous size. These very large specimens live on wild hogs, monkeys, and deer. They often have fixed abiding places, called by the natives their "houses," in the shape of caves in the limestone rocks or hollows in large trees, to which they return after gorging themselves with food, and where they apparently spend the greater part of their time.

The most extravagant tales are told by the natives as to their size, and it is not uncommon to hear of specimens "50 feet long, with eyes like saucers and heads as big as demijohns." Two specimens were obtained by the Menage Scientific Expedition in 1892, one of which measured 22 feet 8 inches in length, the other 22 feet 6 inches. Each of these specimens had a maximum circumference of 24 inches with the stomach entirely empty. Facilities for weighing them were not at hand, but the weight was estimated at about 375 pounds each.

Large pythons are particularly numerous in the Calamianes Islands, Basilan, Mindanao, and, it is said, also in Bohol. Their abundance in any given locality seems to be largely a matter of food supply.

They sometimes occasion loss to cattle owners by killing their young animals, and they have been known to attack and kill human beings.

The specimens kept in and about the houses become tame and are entirely harmless.

Among the nonvenomous serpents there is a small group of some ten species, representing four genera, which are exclusively confined to the Philippines.

There are numerous venomous serpents in the Philippines. The annual mortality from snake bites is said to be great in the little island of Lubang to the northwest of Mindoro, but is certainly not serious in any other island of the group, although there are cobras in the eastern chain of islands and in the Calamianes group. The genera Elaps, Naja, and Erigonocephalus are also represented.

The poison of some of the venomous species is extremely active, and, if fairly introduced into the circulation, ends in death, so that only prompt and radical measures will save life after one has been bitten.

The natives are firm believers in the efficacy of "the snake stone," of which the following curious account has been given by Father Delgado, when speaking of the snake known to Tagalogs as alupon, and to the Visayans as aguason. He says:

It is found almost in the sea, as well as in the plains, the towns, and even houses, where it goes to seek rats and other small animals for food. Its poison is very active and deadly if one does not have recourse promptly to some one of the remedies with which Divine Providence has enriched this country. One may readily cure himself

with the snake stone, which is nothing more nor less than a piece of deer horn, or buffalo horn, burned and broken up to resemble bits of rock. Both kinds applied to the bite have the same effect, while a portion of them scraped and mixed with cold water is given to drink. Also the stone which I myself discovered in the Visayan Islands is a medicine and an admirable antidote. I called it St. Xavier's stone on account of having discovered it in the town of San Javier de Palompon, when I was curate there. Scraped and reduced to a powder it is given as a drink in water, and it is also applied to the wounded part, mixed with lemon juice, and it both quiets the pain and counteracts the effect of the poison.

The Dahun-palay (rice-leaf snake) is universally dreaded by the natives. Under this name they include a number of distinct species of green snakes, most of which are absolutely harmless, although one at least is very deadly. The large poison glands give its head the typical arrow shape so widespread among the venomous species, while its neck is very slender, and its body short, thick, and strong. Why this species should be confounded with the perfectly innocuous green whip snakes, to which the same name is applied by the natives, does not appear, yet in many localities they seem to fear the latter as much as the former.

Two species of geckos are common in the houses. One is very small, and may be seen at any time running up the walls or back down upon the ceiling. It feeds actively on mosquitoes, house flies, and other insect pests, works noiselessly, and may be regarded as an almost unmitigated blessing. The other species has a large, thick body, sometimes attaining a length of 8 inches or more. It is comparatively sluggish in its movements, and sometimes loses its footing when running back down on the ceiling and falls. It has a loud call, which it is fond of giving, and it often interferes more or less seriously with one's slumber. Its call becomes particularly loud and annoying when emitted, as it often is, from within a large hollow bamboo of the roof into which the animal has crawled. Although ordinarily harmless enough, these large geckos bite viciously at anything put near them when they can not readily escape, and are quite capable of inflicting disagreeable wounds. The natives sometimes take advantage of their pugnacious disposition and set them to fighting with each other or with rats.

There is an almost endless variety of lizards. Large iguanas are very abundant in many localities. They sometimes attain a length of more than 5 feet, and are able to swallow fair-sized fowls whole. They are often to be seen in great numbers lying astride of the limbs of trees and bushes along the river banks, where they sun themselves and sleep. When disturbed they drop into the water, usually disappearing and swimming away beneath the surface, but sometimes, when greatly frightened, swimming so actively that they seem literally to run on the top of the water, keeping almost the entire body out of the water. Their eggs are considered a great delicacy by the natives and are really very good, while the flesh of one species, variously known as ibid, ibit, and pelubid, is very highly esteemed.

Flying lizards of several species are very common in the forests. They are often protectively colored, and are well nigh invisible so long as they remain quiet on the gray trunks of trees. They become suddenly conspicuous as they spread their flying membranes, which are often brightly colored, and sail from tree to tree, only to disappear again almost miraculously when they alight.

Crocodiles are extremely abundant in many of the streams and fresh-water lakes, and are sometimes met with in the sea along the coast.

They frequently attain very large size. The Jesuit priests at Manila are authority for the statement that "there are specimens which measure some 10 meters," but this seems rather incredible. They certainly do sometimes measure as much as 18 feet in length. In certain parts of the archipelago they occasion no little loss of life, while in other regions the natives may be seen bathing with apparent impunity in streams where they are known to abound. The natives explain this by saying that the taste for human flesh is acquired, and that having once tasted it by accident a crocodile is content with nothing else and becomes a man-eater.

Land turtles are common, but of small size and of no commercial importance. Sea turtles have the largest dimensions, are not infrequently captured by the fishermen in their weirs, and their flesh is highly appreciated as an article of food. The tortoise producing the beautiful shell of commerce is abundant, and a considerable business is done in the shell.

Frogs occur in great variety. One small species appears in immense numbers with the oncoming of the rainy season, and even on some of the streets of Manila the noise of its outcry sometimes almost overpowers other sound. In the forests there is a tree frog with enormously developed membranes between its toes, which seem to aid in supporting it in its long leaps. Toads occur, but are less common than frogs and there are fewer species.

FISHES.

Marine fishes constitute one of the chief sources of food supply in the Philippines, while some of the fresh-water species also are largely depended on by the natives. The number of species of fish in the waters of the archipelago is doubtless much larger than that of any other group of vertebrates represented in the islands, yet practically no scientific work has been done on them.

The method most extensively used for the taking of fish is the construction of pens or "corrals," which are to be seen in large numbers along the coasts wherever the water is shallow and the necessary food supply present. The sides of these pens are constructed of slender pieces of split bamboo, bound together with rattan in such a way that long pieces can readily be rolled up and transported from place to place. When it is desired to construct a "corral" at any given point, stakes are driven into the sea bottom, and the siding is then unrolled and fastened to them. These corrals are sometimes so placed that they surround the favorite feeding ground and are immersed at high water. The fish then come in over the top at high tide, and the ebb leaves them imprisoned.

More commonly, however, the walls project above the surface of the sea at all times. A long line of the close bamboo fence leads from near the shore to the corral, which has narrow openings at the point where this fence joins it. The fish follow down the line, enter the corral, and are too stupid to find their way out of the openings through which they came before the fall of the tide renders it impossible for them to reach it.

Frequently a narrow lane leads from the main part of the corral out to comparatively deep water, where it ends in a circular pound. The opening from the lane into the pound is surrounded by pointed bam-

boos, directed into the latter, so that when the fish have once entered it they can not escape. Their tendency to run toward deep water as the tide falls results in the imprisonment of the whole catch here, and they are then either speared or dipped out with a scoop net.

Very large catches are not infrequently made. The fish are sold fresh so far as practicable, but any that remain unsold are split and sun dried. In this form they find a ready market.

Another method in vogue at certain points, notably at Malabon, near Manila, is the suspending of very large dip nets from masts erected on boats or bamboo rafts by means of a contrivance not unlike the old-fashioned well-sweep, so that they can be quickly lowered and raised.

Seining is practiced to some extent, but almost invariably in the shallow waters along the coast. The nets, which are of comparatively small dimensions, are run out from native boats and are then hauled in toward the beach.

In the Tanon channel, and at various other points in the archipelago where conditions are suitable, deep-water traps are used, which are sometimes sunk in as much as 200 fathoms of water. They usually take the form of loosely woven wicker or bamboo baskets 6 by 4 by 2 feet. At one end there is an opening leading inward, protected by the usual pointed bamboos. The trap is baited with meat, and the fish having once entered can not readily escape. The line by which these traps are raised and lowered is simply a series of long pieces of split ratan. A load of stones is necessary to sink them, and these are often so adjusted that a jerk on the line will loosen them before the trap is hauled up. The position of each trap is marked by a buoy at the end of its line, and this method can be used in a given locality only at the season when the sea is comparatively quiet; otherwise it would often be impossible to tend the trap, while the buoys would carry away, resulting in their loss. Particularly choice fish are taken by this method.

In the very shallow waters along the beaches immense schools of small fishes are to be met with at certain seasons as they run in over the shoals in order to escape the attacks of the larger species or of full-grown individuals of their own kind. The smallest of them, merely salted without drying or other treatment, are considered a great delicacy with the natives, who have several ingenious methods for their capture.

One of the commonest is the use of a circular casting net some 10 or 12 feet in diameter, with leaden sinkers around the edge and a cord attached to the center. It is sometimes thrown from a boat, but more frequently the operator wades in the shoal water. Small stones or bits of bait are thrown in to attract the fish, and when a school has gathered the net, which has been properly coiled up, is given a rotary motion and thrown into the air over them. The centrifugal force of the heavy leaden sinkers causes it to spread out to its full extent before it falls into the water, where it quickly sinks to the bottom, imprisoning anything that happens to be under it. The operator then takes hold of the cord attached to the center, which is, of course, provided with a float, and pulls on it, the sinkers naturally all dragging in as the net is raised and effectually imprisoning any fish that may have been caught under it.

Another method much in vogue is the use of a large scoop net attached to two long bamboos, the ends of which are furnished with

pieces of wood, so fashioned as to run easily along a smooth, sandy bottom. The operator wades out as far as possible, sinks his net, and pushes it rapidly toward the shore, raising it when he has a sufficient catch.

Spearing is sometimes resorted to at night in the waters of sheltered bays and coves. Torches of resin or of dried palm leaves are employed to attract the fish.

Finally, hook and line are sometimes resorted to in the waters along the coast, but this method is comparatively unimportant.

Weirs similar in general plan to those used for sea fishing are constructed in the fresh-water lakes, and especially in the rivers, when the fish are running. Gill nets are sometimes stretched entirely across small streams from platforms erected for the purpose, and are raised by pulling simultaneously on both ends. Dip nets are also considerably used, and hook and line are brought into play more frequently in fresh than in salt water.

A species of mud fish, known to the natives throughout the islands as dálag, is found throughout the rice fields during the rainy season, and at this time the natives may frequently be seen wading in the fields, provided with basket-like traps, with sharply pointed bamboos surrounding the open end, which they continually thrust down into the water, on the chance of imprisoning the unfortunate dálag under them. The fish are so abundant that they often succeed in making considerable catches in this way. The natives insist that the dálag buries itself in the mud before the oncoming of the dry season, but as it is quite capable of working its way through the shallowest water, or even over bare ground where the grass is damp, it is more reasonable to suppose that it finds its way into the paddy fields from the streams which are used to irrigate them, and departs again before they dry up.

Owners of fish corrals, seines, etc., often make a steady income, and in return for the privileges which they enjoy are compelled to pay a tax for the benefit of the town to which they belong.

It is needless to say that no measures looking to the propagation or preservation of valuable food fishes have been put in operation in the Philippines. At Malabon, however, the natives have hit upon the plan of capturing small fishes, which grow rapidly, and feeding them in artificial ponds until they reach large size.

Among the marine forms there are a number of poisonous species, the eating of which sometimes occasions severe illness, and even death.

Those who may in future undertake a systematic study of the fish of the Philippine Archipelago will do well to investigate a method sometimes employed for taking them by the Tagbanuas of the island of Palawan.

They make use of a mixture of several vegetable substances with earth and wood ashes, which is known as macásla, from the name of its most important ingredient. The macásla itself is the fruit of a low bush. It is pounded up together with a tuber known as carote, leaves and fruit of the cayenne pepper, and two other vegetable substances together with ashes and earth. The mixture is placed in a wooden trough, covered with banana leaves, and allowed to ferment over night. It is then placed in wicker baskets, and men, women, and children provided with these wade out over the shoals along the shore at ebb tide and await the flow. When this sets in they form a long line, lower

their baskets into the water, and jerk them about by the thongs until the macásla has been washed out. They then gradually move in toward the shore.

The macásla soon begins to exert a marked influence on the fishes, which at first swim about actively, coming to the surface or leaping out of the water. After a little they float helplessly or sink to the bottom, where they lie on their sides. The small ones may then be picked up and thrown into baskets. The larger ones should be disabled by a blow from a knife or a club, as they are apt to dart off for a short distance when touched, only to lose their equilibrium and sink to the bottom again. The effect of the poison, which seems to act through the gills, eventually works off, and only the very smallest of the fishes die from it. This method would be invaluable to the collector, as it would enable him to catch a species which will not take bate, and which, from the nature of the locations which they frequent, can not well be netted.

The unsatisfactory state of our knowledge renders it difficult to say much as to the species which are of especial importance. The following statement on the subject has been furnished the commission by the fathers of the Jesuit mission at Manila.

PISCES.

This lowest class of vertebrates is undoubtedly that which presents the largest number of species (in the Philippines), but is at the same time least known. We shall consider the principal species of the Selachii and Teleosteii under their five suborders, the Lophobranchii, Plectognathi, Fisostomi, Anacantidæ, and Acantopteri.

Selachii.—Under this order we find the sharks, or Pating (*Charcharias verus* Cuv.), which abound in the marine waters of the archipelago. The Indians engage in the dangerous task of capturing such voracious animals on account of the profit which they derive from the sale of their fins and tails, which constitute a gelatinous food, highly prized by the Chinese, who pay a large price for it. The genus Pristis is represented in Philippine waters by the sawfish (*Pristis antiquorum* Lath.). Pertaining to the same water are the plow fish, or sut-sut (*Rhynchobatus amyclostomus*), dogfish, rays, and hammer fish (Sphisura sigona).

Teleosteii.—There are a great number of noteworthy species of the genera Triancan thres and Ballistes, belonging to the same suborder Plectognathi. They have the body compressed and the mandibles provided with eight teeth placed in one single rank on each, and covered by true lips. Their flesh, little esteemed, is even considered harmful at certain times of the year. They assemble in large schools, and produce beautiful effects, the reflections of the blue bodies shining like precious stones. The representatives of the genus Ostracion, trunkfish, do not have the body covered by scales, but with regular bony plates.

The most noteworthy species are *Ostracion gibbosius* L., *O. cubicus* Gunth., and *O. cornutus* L. There are forms with triangular bodies with or without spines; others have the bodies quadrangular, covered with spines. Species of the genus Tedrodon (porcupine fish) abound in these waters.

Lophobranchii.—Representing this suborder we find the sea needle

(*Lyngnathus conspicillatus* Jem.), so called from having the body very slender and long and of almost uniform diameter throughout; also the sea horse (*Hippocampus guttulatus* Cub.).

Fisostomi.—This suborder is represented in these waters by various species of Murenidæ, Clypeidæ, and Siluridæ. The genera Mursua, Ophychtys, Muronesare, and Anguila are especially worthy of mention. The natives spend much time in fishing for eels, which are notable for their large size.

Among the Clypeidæ are found sardines, such as the Bañgos (*Chanos salmoneus* Forik), the Buan buan (*Megalops ciprinoides* Bronnss.), and the shad (*C. alosa* L.).

Finally, the Silluridæ or Bagres are represented by the genera Clariæ (Alito), Plotosus, and Rita, which are for the most part river or fresh-water fish. They have the skin bare or covered with large bony plates, but never possess true scales. There is a peculiar species of the genus Rita in the Philippines (*Rita manilensis* C. V.). The genus Danguila belongs to the same natural group as the tench and the barbels.

Anacanthidæ.—Of this suborder there are found the Gabidæ and Pleuronecthidæ. Among the former one of the most notable species is called Bregmaceros macclellandi Thoms, characteristic of Philippine waters and very similar to the Bacalao, the cod, and other gadadæ with light meat of good savor. To the genus Pleuronectes belong the turbots and soles. The latter, so highly esteemed on account of their delicious flesh, are obtained in large quantities in these waters. The most important species are *Solea ovata* Richard, and *Pseudorhombus russelii* Pleck.

Acanthopteri.—Belonging to this suborder there are found in the Philippines the Labredæ, Percidæ, Mullidæ, Esparidæ, Triglidæ, and Escombridæ. Among the Labredæ are *Pseudoscarus eruginosus* C. B., *Julis lunaris* L., *Pseudojulis girandi* Fleeck., *Novacula pentadactila* L., and others. There are various fish of the genus Ophicephelus, called by the natives dalag. Their flesh is insipid, but light and easy to digest. They constitute an important article of food with the Indians. They abound in rivers, lakes, and pools, and during the rainy season are found even in the rice fields. The species best known is *Ophacephelus striatus* B. The one called Martinico (*Anabas scandenas* C. V.) also pertains to this group.

The Percidæ are quite numerous, and are represented by the Lañgaray of the Pasig River (*Ambassis urotenia* Bleeck.), the Serrano (*Mesoprion annularis* C. V.), the Serrato (*Serranus altivelis* C. V.), the Lapolapo of Cebu (*Serranus oceanicus* Forsk.), and the Bañgo oñgoc (*Mesoprion bohar* Forsk.).

Among the Mullidæ the more important ones are the Saramollete (*Mullaides flavomeatus* Lac., *Upeneces trifoseratus* Lac.) and others, all of exquisite taste and beautiful colors.

The Esparidæ, or gildings, so highly estimated on account of their delicious flesh, are represented in the Philippines by the genera Lethrinus, Gems, Pimelepturas, and Chrisophois.

Among the Tringlidæ may be mentioned the flying fish (*Pterois volitans* L.), and the sea hog (*Scorpona polyprion* Bleeck.).

The most important Escombridæ in these waters are the horse mackeral of the country (*Esconder micro lepitodos* Rupp.) the plataco (*Platace teira* Forsk.), the Vadigo, or Talaug-talaug (*Lichia glauca* L.), and the Caranga (*Carance rotleri* Bl.).

Further among the Eraquinidæ are found *Percis cylindrica* Bl. and *Sillago sihama* Forsk. The latter is one of the best food fishes of these waters.

Among the mugilidæ is the Talilong or mullet (*Mugil sundanensis* Bleeck.).

Among the Scienidæ the conger (*Corvina milis* C. V.) and the alacaac (*Umbrina russelii* C. V.) are worthy of mention.

Of the Quetodontidæ the bream (*Chotodon ocellatus* Blec.) and the quitong (*Scatophagus ornatus* C. V.) may be mentioned.

Finally the gobidæ are represented by the gobido of Manila and Angat (*Gobius giuris* Ham. Busch.).

MOLLUSKS.

The Philippines are famous for the wonderful variety and abundance of their "land shells," which are, with few exceptions, formed by snails. They are of the most varied form, size, and color, and many of them are extremely beautiful. Not a few of them are protectively colored, and the nature of their shells is such that when the tree trunks that they frequent darken with the wet they darken at the same time. Many of the species are extremely local in their distribution, and the study of the land mollusca of the archipelago is of absorbing interest to the conchologist. So far as we at present know, none of the species are of great practical importance to man, although some of them are occasionally eaten by the natives. The fresh-water and marine forms are very numerous and many of them are exquisitely beautiful. For the most part they are like the land species, of interest and importance chiefly to the conchologist, but there are some exceptions to this statement.

There are a number of species of edible oysters, clams, etc., which are used by the natives, and to some extent by Europeans also, as food. Many of them are very palatable, although none of them compare with the oysters obtainable in the United States.

The shells of one species (*Placuna placenta* L.) split into thin, flat plates, and cut into squares some 2 inches on a side, are almost universally used in place of window glass. They are fitted into sliding wooden frames, and when in place serve to modify the glare of the tropical sun, producing much the effect of ground glass.

The shells of the enormous giant clams of the genus Tridacna sometimes attain a length of 5 or 6 feet, and weigh hundreds of pounds. The valves are considerably used for baptismal fonts, etc., and the natives sometimes burn them to make lime. Divers are afraid of them, and with reason, for they close with a grip like a vise, and were one of them to catch a man's foot he would certainly be drowned.

True pearl oysters are found in the southern waters of the archipelago along the coasts of Mindanao and Palawan, and in the Sulu Archipelago. They are especially fine and abundant in the latter region, and very valuable pearls are frequently obtained there. There are probably no more expert divers in the world than the Moros, who train themselves to remain under water two minutes or even longer. The Sulu pearl fisheries are controlled by the Sultan, who rents the privilege of exploiting them, and to whom all pearls above a certain size are held to belong. At present a Chinaman has the monopoly of the fisheries near Sulu itself, and is using half a dozen small sailing craft provided with complete divers' outfits.

The shells bring a good price, and there is a ready market for them. At present they are nearly all shipped to Singapore.

The wonderful chambered nautilus, or, as it is more commonly called, the pearly nautilus, is so common that its shells are much used by the natives for drinking cups. In the Tañon Channel it may readily be taken alive in the deep-sea fish traps previously described. A dozen or fifteen specimens are sometimes taken in a single trap in the course of a day. Very fine specimens of the delicate paper nautilus are occasionally obtained.

The shells of certain of the marine mollusks serve a variety of purposes apart from that of making lime. Some of them with hard and serrated edges are used in harvesting rice for cutting the straw. From the great opercula of others bracelets and other ornaments are carved. Some of the more beautiful species are utilized in other ways for the formation of ornaments. The cowries, formerly used in lieu of money in certain countries, have ceased to possess any commercial value. The taclabo (tridacna) shells are so hard that the Moros sometimes pound them up and ram the pieces into their rude cannon, thereby providing themselves with projectiles which are very effective at short range.

The land mollusks of the Philippines have already been quite thoroughly classified. Much still remains to be done with the marine species, which will doubtless, however, present fewer new and peculiar forms than have been found on land.

ARTHROPODA.

The arthropoda, or "animals with jointed feet," are represented in the Philippines by an enormous number of species, and have been as yet very little studied. Shrimps, crabs, and lobsters abound in the waters of the archipelago, and form an important part of the food supply of natives living along the coast or on the banks of fresh-water streams.

Spiders are found varying in size from tiny, almost microscopic creatures to great hairy specimens the size of our tarantulas, which are capable of inflicting a painful injury with their bite. There are several species of scorpions, some of which are very large and sting severely.

The number of species of insects is so large that it would be folly to hazard a guess at it. House flies are abundant, and in some places become a great nuisance. They were often found in countless myriads about the trenches from which the insurgent troops were driven, and must have been a prolific means for the spread of disease.

Mosquitoes are sufficiently numerous in the lowlands, so that nets are necessary for protection at night. In view of the part which they are believed to play in the spread of malarial diseases a careful study of the Philippine species is desirable.

Beetles are found in endless variety, as are butterflies and moths.

There are three species of honey-making bees. One of these is of very large size, and its combs are built pendent from the branches of trees. The other two species store their honey in hollows. One of them is stingless. Honey is an important article of food, and wax an article of commerce among the wild tribes.

Wasps of various species are abundant, and some of them sting most viciously.

The number of species of ants is very large, and they occur in countless millions. Doubtless the most important is the termite, or white ant, which inflicts great damage on wooden buildings, often causing very serious loss. A tiny red species frequently invests dwelling houses and occasions great annoyance by swarming over the food, which can be protected from it only with the greatest difficulty. A much larger brown species has the same objectionable habit. Among the woodland forms there are many which bite or sting viciously, and some which do both. It is not uncommon to see columns of ants an inch or more in width extending through the woods for many rods and looking much as would a black or brown rope if dragged slowly along. An examination of one of these columns reveals the presence of several different kinds of individuals, each evidently assigned to a definite duty, and the column moves on with all the precision of a thoroughly-drilled army. One who is so unfortunate as to inadvertently put his foot on it will not soon forget the result.

Some of the species raise hills 6 feet high, others nest in dry leaves. Still others build mud nests in the trees or bushes. One of the latter species with a thick body three-fourths of an inch in length has a bull-dog grip, and when it has once taken hold its body may be torn from the head without causing it to let go. The sting of another of these nest-building species causes intense pain, frequently attended by some fever.

Serious plagues of locusts sometimes occur, wiping the growing crops out of existence, while the larvæ of many of the insects inflict more or less serious injury of one sort or another. Some of them bore in timber or in living trees, while others blight the growing rice. A few years since the coffee growers in the province of Batangas were rapidly accumulating large fortunes, when a borer appeared which worked in the stems of the coffee bushes and soon wiped the plantations out of existence. Thus far no effort has been made in the Philippines to combat the insect pests, but the matter should be given serious attention in the future.

ECHINOBERMATA, VERMES, CŒLENTERATA, AND PROTOZOA.

The remaining important groups of the animal kingdom may be very briefly dismissed. Although they are all most abundantly represented in the Philippines, they have as yet hardly been studied at all, and a rich and almost unexplored field lies before the zoologist. The damp forests and warm seas of the archipelago swarm with life. Star-fishes and sea-urchins are abundant, and some of the latter are much feared by fishermen and divers on account of the danger of stepping on their poisonous spines. Land leeches swarm in the damp forests of certain of the islands and seriously annoy everyone who attempts to pass. They show a special fondness for tapping the veins on the inner sides of the ankles, and not infrequently cause considerable loss of blood.

It is impossible to conceive of a more beautiful sight than that afforded by sailing over the wonderful coral beds of the southern islands and looking down through the clear water at the wonderful display of beautiful form and color in the depths below. A number of the islands of the Philippine group, like Guimaras, Cebu, and Siquijor, are covered completely over with a thick cap of coral lime-

stone, showing the important part that the coral polyp has played in the archipelago during bygone centuries. That work is still going steadily on.

The prevalence of amœbic dysentery in the Philippines shows that we can not even afford to neglect the protozoa in our study of animal life, and it is certain that a careful study of all the important groups, from the highest to the lowest, would result in great practical good.

PAPER NO. VII.

ETHNOGRAPHY.

PROLOGUE.

The study of the races of man is always of great interest. This is especially true in the Philippines, where live the most distinct people, representing the greater part of the races of the globe, in some instances pure, in others mixed since very remote times. Here man presents himself with the greatest variety of characteristics conceivable, as has been noted by eminent ethnologists; for, beginning with the Negrito and ending with the Chinese and European mestizos, all the races are represented in these islands.

All these most varied ethnological classes are mentioned in this treatise, which is divided into four parts. In the first, ethnogeny, the origin of these races is gone into. In the second, ethnology, their physical characteristics are analyzed. In the third, etology, the customs peculiar to each people are described; and finally, in the fourth part, entitled "Idiomography," the languages or dialects are discussed.[1]

In order to reconcile brevity with the greatest possible clearness, we do not, as a rule, discuss or refute opinions opposed to those which are set forth, but merely mention them, setting down what is ordinarily considered most certain, or has seemed so to us. By this means the material is placed in convenient form for the reader, in order that in disputed and doubtful cases he may form his own opinion.

[1] The data contained in the second and third chapters of the fourth part are entirely due to Father Francisco Chorro, S. J.

PART I.

ORIGIN OF THE PHILIPPINE PEOPLES.

CHAPTER I.

The Negritos are generally conceded by authors, who have investigated the subject, to have been the first inhabitants of the Philippine Islands. Absolutely conclusive arguments in favor of this statement have not been brought forward, but an attentive study of the different races of the archipelago, a minute comparison of the languages they have spoken, and finally the usages, customs, and distinctive characteristics of the Negritos make this theory highly probable. We have, furthermore, the testimony of the natives themselves, handed down by tradition from father to son, who say that when the first Indians arrived in the Philippines they were already held by the Aetas, by which name they designate the people here called Negritos.

ORIGIN OF THE NEGRITOS.

Their origin, the place from which they came, and also the prehistoric time of their establishment in this region, are difficult to determine with certainty.

The time of the arrival of these blacks, as well as the reason for the same, and other points, are found by the contemporaneous writer[1] "In the history of the fierce Cambises, when the inhabitants of Ethiopia were fugitives, fleeing from the cruelty of the tyrannical conqueror, in the year 1529 before the Christian era, who, strengthened by their misfortune, launched themselves upon the stormy sea, navigating in fragile and small embarkations, without any definite course, and driven by the wind or swept along by currents, reached the places where we find them to-day." This explanation, while not altogether impossible, is, on the other hand, far from certain, and has no weight of authority further than the opinion of a private individual. On the other hand various authors believe that these Negritos have their origin in equatorial Africa, and that, having sailed from there and lost their course, or by some other chance, they went to New Guinea, and from the territory of the Papuans came to the Philippine Archipelago.

[1] Work entitled "Exploration of the territory of Davao, Philippines," made by Don Joaquin Rajal, p. 13.

The Jesuit father, J. Delgado, in his important history of the Philippine Islands[1] discusses in detail this very point. Here is his opinion, condensed into a few words, and freed from lengthy digressions:

It is difficult to ascertain from whence or how the Negritos can have come to these islands, for authors are agreed only on the fact that they have come, and are here, and that they inhabit the most rugged mountains without any sort of order. Such savages must have come from New Guinea or the country of the Papuans, who are below the equator. They may have come to that place from Nueva Bretaña, which is the nearest land; they might have arrived here from New Holland, and to this they may have come from other contiguous territory more to the south by some 40 degrees, having finally reached this by unknown land bordering on the Cape of Good Hope and Caffraria. Wherefore the fount and origin of such a race of savage blacks is Caffraria, and this also was the opinion of the celebrated geographer, Homman de Norimberga. Nor does this theory demand other proof than the knowledge that there do not exist blacks of this sort in any other country except Caffraria, in Africa; on the side of America and about the Straits of Magellan all of the nations which have been discovered are Indian, very distinct from the Caffirs, both in body and intellect.

It should be added that if the Philippine Negrito, as he exists to-day, be compared with the African, a sufficient number of characteristics will be found to indicate a relationship with the latter race. This is the opinion of Señor J. Mallat, who states very definitely[2] that if some difference is noted between the two types it may readily be explained as a result of the very distinct conditions between the two countries which have fallen to the lot of the one and the other. The Filipino has a very fertile soil, and shelters himself in the densest forests, while the African inhabits arid deserts burned by the sun.

As for the immediate origin of the Negritos, it is believed by many historians that they come in reality from New Guinea, and this conclusion readily reached by exclusion, for in the north no people is found similar to the black Negros, and the inhabitants of Japan, although not entirely white like the Europeans, are not black, but are rather of a brownish yellow color. To the northwest lies the Empire of China, the inhabitants of which are, as a rule, light colored, although one sometimes finds swarthy individuals among those who inhabit the seacoast. The nations which inhabit the coast region of India are Malabars, who, although of quite dark color, are neither blacks nor Caffirs, but are so distinct from them that they would have few differences from Spaniards or other Europeans if they were white.

It may be added to what has been said that the nature of all these people is very different from the fierce character of the Caffirs. They are in general tolerant, tractable, capable, and well adapted to business and to the maintenance of relations with other people, while the blacks almost completely lack all of this. The numerous and well-marked Papuan types, which are to-day to be met with in the most inaccessible and roughest mountains of the archipelago, are rough and uncivilized in the extreme, nor do they have more culture or practice more industries than they may have had and practiced in the past centuries.

The following historic case is also worthy of notice, and may considerably strengthen the opinion set forth: In the year 1645, when Gen. Lopez de Villalobos was in the Moluco, and desired to send from there a ship to New Spain in order to give to the viceroy an account

[1] Historia general sacro-profana, política y natural de las islas del Poniente, llamadas Filipinas, por el P. Juan J. Delgado, de la Compañia de Jesus, parte la libro, 3°; capitulo, 1°.

[2] In the work entitled Les Philipines, tom. 1, Cap. III.

PLATE I.

NEGRITOS, OR AETAS.
Types as found to-day in the mountains.

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TILDEN FOUNDATIONS

of the condition in which he was, he gave orders that the voyage should be undertaken by the southern route and the land of the Papuans, or New Guinea, for greater security, believing that the sea in those regions would be smoother than to the northward. The vessels sailed on their course, and having navigated to the coasts of New Guinea with favorable winds, a distance of some 600 leagues, they ran great risk, because large embarkations filled with black negroes came out from the shores, and these blacks were so fierce and warlike that, in order to prevent being captured, it was continually necessary to resort to arms; and before the year 1859 Don Alvaro de Medaña, having set sail from Callao with the purpose of colonizing the Solomon Islands, discovered a large island full of blacks who came from New Guinea.

It is therefore not strange, but on the contrary quite natural, keeping in view the preceding facts, that the blacks of New Guinea may have come to people the islands of this archipelago. At all events, this belief is perhaps the most probable, at least so far as concerns the first and most important invasions. However, it may well be that in these early times blacks from Australia, whose characteristics do not greatly differ from those of the Papuans, may have come to the Philippines through losing their way, or for some other reason. Nor can it be doubted that the Philippine blacks may have originated, in part at least, as others believe, from those who in remote time dominated the Peninsula of Malacca and the Asiatic archipelago.

THEIR FORTUNE IN THE ARCHIPELAGO AND THEIR PRESENT STATE.

This race, savage and barbarous to a degree, and consequently weak, conquered later by more robust invaders who were endowed with a certain degree of culture, was compelled to take refuge in the mountain forests, where it is still to be met with at different points in the archipelago, although decreasing from day to day and soon to completely disappear. The reason for this is, in addition to inborn barbarism and a nomadic life, that this race, regarding the rest of mankind as enemies, has passed its life in a most regrettable isolation, living in a manner more fit for wild beasts than for rational beings.

CHAPTER II.

MORE RECENT POPULATORS.

The Negritos, being in possession of the land and being warlike and cruel, undoubtedly had many encounters and struggles with the new invaders, and the latter, being victorious, took possession of the coast region and the fertile plains. When their enemies, the Negritos, had taken to the forests, they established themselves little by little in these pleasant regions, forming towns and states of a certain sort, governed by chiefs or rulers, with the title of rajah, under whom they defended themselves against their enemies. This is the origin of the large number of provinces in which they were distributed at the time of the arrival of the Spaniards. The greater part of them, as well as of the towns, still retain their names, which are in perfect accord with the language of these new inhabitants.

GENERAL ORIGIN OF THE INDIANS.

What were they, and whence did they originate? A certain combination of relationship and affinity in language, usages, and customs, as well as in physiognomy, leads to the belief that they were derived from the Malayan race, which is that of the Indian native to the islands situated between Ceylon and this archipelago. From this trunk it is believed that almost all the natives are primarily derived, although they show a great variety of types. This variety is so great that at first sight it seems to make impossible a belief in a common origin, but this can be and is sustained, especially by the analogy and language which may still be discovered, and which is undoubtedly the surest means of determining the origin of peoples.

It is, indeed, a cause of no small wonder to find in these regions so many people with different languages that the same tongue is hardly spoken on two islands. In Luzon each province has its special dialect, which is not understood except by its inhabitants. The Tagalogs and Pampangos speak different tongues. The Pangasinans, Ilocanos, and Cagayans have in their respective territories their special languages. The people of Camarines are distinct from all the others. The Visayans, although almost all of them speak one language, nevertheless vary it so much in the different provinces that it seems like a distinct tongue in each. The native of Bohol does not pronounce certain letters. The native of Cebu has his special way of speaking, which is distinct from that of the native of Samar and Leyte, whose dialect is richer, more complicated, and has a greater abundance of words, which are, furthermore, pronounced more rapidly than in the regions above referred to; and this without mentioning the island of Mindanao, where, on account of words derived from the Moro dialect, the difference is perhaps greater than in any other island.

Notwithstanding this the great readiness with which the natives of one province learn the languages of other provinces and towns proves that many of these dialects have a common origin, for the Europeans can not do this without much laborious study, nor could they do it if their dialects differed as much among themselves as they differ from ours. It is proved furthermore by the large number of common words, although they may be differently conjugated and combined and sometimes changed in their significance as well as in pronunciation, which may be nasal or guttural.

This common origin is believed in by various authors, and among them, curiously enough, Father Delgado, who has already been mentioned, and who does not agree with certain Spanish authors in assigning a Malayan origin only to the Tagalogs and different origins to the other peoples simply on the basis of the diversity of languages. It might undoubtedly very well be that the natives of these islands should have a single origin and should yet go on separating from each other and varying in the matter of language. Furthermore, we know through history that the discoverers brought with them Malayan interpreters, who were distributed in those early days through the Visayan Islands and Mindanao, and who were quite well instructed in the language of that region. From this it may be inferred that there is no occasion to seek one origin for the Visayans and Mindanaos and a different one for the Tagalogs, whom everyone admits to be Malay. Furthermore, it is certainly evident that the two tongues, Tagalog and Visayan, differ little or

not at all in the general plan, and in the roots from which the verbs are derived, being almost identical in all their parts, and even the conjugations in the one and the other tongue are the same, and the language among the Visayans being more univocal, the pronunciations are so different as to appear distinct to those who have not passed some years in the country.

We admit that there would be greater difficulty in satisfactorily determining the origin of the Pampangos, neighbors of the Tagalogs, who have a distinct language, but their features, dispositions, and customs agree with those of the Tagalogs, and, furthermore, in this case the fact already mentioned as to the readiness with which they learn each other's language and all learn the language of the Visayans is of significance. Various experiments have been made with Tagalog and Pampango children who have been taken to the Visayan Islands and in less than a month have spoken the language as if it were their own. A similar argument may be made in case of the Cagayans, Ilocanos, Pangasinans, and other people, the difference in whose dialects is not sufficient to destroy belief in their Malayan origin.

On the other hand, Fr. M. Zuñiga defended on various grounds,[1] and, singularly enough, on account of the agreement between the dialects, the theory that these Indians came from tropical America. Other authors find the immediate origin of all or some of the Philippine peoples in different islands or lands of Oceania.

NATIVES OF MINDANAO.

Let us now consider with particular care the origin of the native inhabitants of Mindanao. It would appear that at least as far as their immediate origin is concerned it can not be different from that of the other Indians, whether they came there from Borneo, from the Moluccas, or from others of the Indonesian Islands.

So far as concerns the Manobos, Bagobos, and the tribes derived from them, a modern explorer believes[2] that if one studies their vocabulary its origin is obviously related to that of the Ovas of Madagascar, whose individuals must have arrived on the island which they to-day inhabit at the same time that the former people reached the Philippine Archipelago. It would seem probable that, having undertaken together the emigration from Asia, they may have become separated at sea through causes beyond their control. It may also be supposed that some of the Ovas arrived after the others, as is indicated by the Visayan word "bago" (new), a classification which might be explained with reference to their coming to the country. And we should say that the Manobos must have been somewhat earlier, because if their coming had extended over a considerable period up to the arrival of the Bagobos they would not have had such an appropriate term for designating the common time of their arrival in the country. The word "manobos" expresses very well the idea, "man of the sort of the ovas," while "bagobos" means "new ovas."

Others believe that the word "manobos" is derived from "manuba," and this in turn from "man-subá," which signifies "inhabitant of a river."

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[1] See his Historia de las islas Filipinas, Sanpaloc, 1803.
[2] Don Joaquin Rajal, op. cit., p. 16.

The Mandayas also, like the Manobos, give origins to various terms, and their antiquity is not to be disputed. The word "Mandayas" signifies "descendent of the Bayas," and "Dayas" or "Dayacs" is the term applied to the natives of southern and western Borneo.

We might continue this discussion to the other different groups which peopled the island of Mindanao before taking up the Mohammedan race, and its origin, more or less remote, might be found to be either Indonesian or Malayan.

CONFIRMATIVE ARGUMENT.

For the rest it is to be clearly borne in mind that certain differences, although they may seem notable, are not sufficient ground for attributing to one race an origin distinct from that of another. Otherwise we should be compelled to seek a different origin for each one of the very large number of tribes of pagans which are to be met with in the Philippines, and especially in the great islands of Luzon and Mindanao. The sort of life that each people leads, the region which it occupies, and other circumstances are more than sufficient to impress upon it a peculiar character which separates it from other peoples, if not completely, at least in very important particulars, as we see happening in Europe among the different nations, like the Spanish, the French, or the Italians, in spite of the close relationships which unite their people.

CHAPTER III.

THE MOROS.

After the Negritos, the true aborigines, and after the second invasion had spread over the entire archipelago, as has already been described, the Moro tribe ought to be cited among the peoples which have most deeply impressed their characteristics in these islands. In an evil hour a death-bearing plague of them invaded many regions of India and archipelagos of Oceania.

TIME OF ARRIVAL.

At what time did the arrival in these islands of the Mohammedan Malays occur? It seems evident that it could not have been before the invasions of the Indians above mentioned, because had this been the case the fact would have been indicated in the written traditions which the Mohammedan race keep, since it is somewhat more civilized than were the other peoples. Nor would it be easy to understand how they could have imposed their rule on the Moros, for we know, on the contrary, that the latter, endowed with greater native valor, imposed their authority on the former and laid the heavy yoke of bondage where they would.

Don Joaquin Rajal, after investigating this point, makes the following statement:[1] "The invasion of the Mohammedan Malays must, in our modest opinion, go back to those authorized by Mohammed and brought to a conclusion by some of his subchiefs. It is well known

[1] Op. cit. p. 13.

that the subjects of that extraordinary man carried the beliefs of Islam throughout India, extended them over the islands of the sound and the other archipelagos of Oceania." A little further down he continues: "Another indication of the antiquity of Mohammedanism in those islands is furnished us by the name Solimán, which was applied to certain rulers, a fact which proves not only their ancestry, but also a frequent contact with their progenitors, as well as expeditions to Mecca, which they make even to-day periodically, and which in former times, according to the traditions which they preserve, were of great importance."

ESTABLISHMENT IN THIS COUNTRY.

When the Moros arrived they met the earlier populators and owners of the islands and waged ferocious war with them in order to establish themselves at the mouths of the large rivers and to be able to spread along their banks, situations which they have always preferred for the sites of their dwellings. Hostilities did not cease, but from the beginning have continued up to the present, caused by the frequent excursions of the Moros for the purpose of taking slaves, practicing piracy, and extending the belief of their sect.

In these repeated encounters the Indians and the Negritos frequently made common cause, attempting to resist their advances, which were, nevertheless, very successful. The result of this seems to have been that those who at first obeyed an hereditary chief and respected certain hierarchies, later, taking a fancy to the richness and delightful character of the country, divided the territory, and establishing a sort of feudalism, in which various chiefs governed more or less independently.

Such is the probable origin and progress of Mohammedan domination in these islands. Others, however, with equal probability believe it to be much more recent, antedating the arrival of the Spaniards very little. The Jesuit Father Combés[1] makes the following statement:

Since Mohammedanism is recent in India, and from there has been carried to these regions, it may be understood that this people have occupied these coasts for but a short time.

Furthermore, many are of the opinion that the occupation of these regions by the Moros does not partake of the character of a national invasion. Father Pastells, S. J., expresses his opinion in the following terms:[2]

Ethnological, philological, and anthropological proofs demonstrate clearly the fact that the Moros did not come in great numbers to occupy the regions of Sulu, Mindanao, and Palawan, but rather that they exerted moral influence over the natives through commerce and a sectarian propaganda, making Moros of the pagans of the coast region by means of their preaching and their superstitious practices. Therefore the uucleus of the population of the coasts of Mindanoa, Basilan, Sulu, and Palawan is composed of natives, and those who came from abroad were only the ancestors of the datos and panditas of the Sultans and sherifes, who are the ones that by hereditary right rule and tyrannize over the great mass of the Moro population. The proof of this is found in the strongly marked Malayan type which they all show. Without going farther it may be seen that to-day the Malayan sherifes come to install themselves, and are received with religious respect in the Moro settlements.

[1] Historia de Mindanao y Jolo, by Father Francisco Combés, of the Company of Jesus. (Vol. I, Chapter XI.)

[2] See Vol. IX of the Letters of the Fathers of the Company of Jesus belonging to the Philippine Mission. (Appendix, p. 638.)

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They are the very ones who are charged with the duty of sustaining and developing the fanaticism of their sect. According to my observations, they are not numerous in the districts of Cottabato and Davao, but are met with more frequently in Isabela de Basilan and Sulu.

It is certain that when Spain established here her domination through the immortal Magellan the Moros were found to be strong at the better points in Luzon, Mindanao, Sulu, and other island groups of the South, where they held many of the natives enslaved, and had led astray many more with the novelty of their doctrines and the beliefs of the Koran.

INTERMARRIAGE OF THE RACES.

At this time the complicated intermingling of customs, usages, and superstitions between the different populators of the islands was not less worthy of note than the anthropological amalgamation which was bound to come as an immediate result of the intimate intercourse and friction of such varied races and peoples. The schism introduced among the pagans and the guerrilla warfare which the Islemites especially waged, and which all the rest imitated, made opportunity for an important and constant slave trade, resulting in such a crossing of the races that two centuries later it was a very difficult undertaking to distinguish the characteristics of the primitive elements which were the origin of such a confused mass.

THE CHINESE AND JAPANESE.

Among the causes which have contributed to bring about the changes in the primitive class throughout almost the entire archipelago must be mentioned long-standing and constant commerce with the neighboring Empires of China and Japan. Before Magellan discovered the Philippine Archipelago the Chinese and Japanese were already making excursions to the coasts of some of the islands in order to possess themselves of the gold which the natives brought from the mountains, in return for which they gave the Indians cloth, arms, and trifles of various sorts.

How much the association and the commerce above referred to contributed to change the type and the character of the natives is a matter concerning which there are differences of opinion. "These relations," says W. E. Retana, "were nevertheless very superficial, and it may be taken as certain that the sons of the Celestial Empire did not modify much or little the anthropological characteristics of the islanders. Neither history, nor philology, nor ethnography lends probability to a belief in the existence of mixed races before the time of the Spaniard."[1] Another contemporaneous author,[2] without denying that there is not seen the least trace of Chinese script in the primitive alphabets of the Indian, nor are there Chinese roots in their dialects, nevertheless inclines to the opposite opinion as regards the crossing of the races, bringing forward the argument that the savages of Benguet use very frequently in their language the sounds "cha" and "che," and that the Tinguianes, who inhabit the heights of Candon, give indication at the first glance of their Chinese origin by reason of their color, features, and dress, and he finally draws the conclusion from

[1] History of Father Conbes already cited. Table V, col. 778.
[2] Author of the work Informe sobre el estado de las Islas Filipinas en 1842.

PLATE II.

GROUP OF MOROS OF THE RIVER PULANGUI AND THEIR DATO (CHIEF).

characteristics, such as broad skull, sharp facial angle, and peculiar hair, which he has noted in some instances as a result of personal examination, a very ancient mingling between the Papuan and Mongolian peoples.

Another writer of our day expresses himself as follows:[1]

The data which prove the effect of the Chinese on the former population of the archipelago are so numerous that we do not believe one who has made a somewhat detailed study of the idolatrous peoples of Luzon can do less than admit it. The proximity of the continent to the western coast of the archipelago, the action of the monsoon, and the adventurous spirit of the sons of the great Empire allow it to be supposed that from very ancient times they came to these Spanish countries of Oceania. It should be remembered in this connection that even in the ninth century the Chinese and Malays frequently entered into relationships with each other, and that before this epoch the Japanese had reached the islands of the sound.

This author further adduces the fact, among other proofs, that the industries of the pagans of Lepanto, which have attracted the attention of travelers, may be due to Chinese origin. In the annals of the Empire it is attested that the Emperor Ton-hi taught his subjects to cast bronze, also the fact that among the religious practices of the pagan tribe the cult of the anitos, so sacred to the Chinese, is seen to predominate.

Be this as it may, it is certain that as the years passed by commerce between China and the archipelago was regulated to a notable degree, important expeditions being made, and many of the members of the same remaining in the islands, especially in Luzon and at points somewhat near Manila. Latterly Chinese immigration has increased to such a notable degree that the mixed Chinese Malayan race is represented in the archipelago by perhaps half a million individuals.

THE NATIVES OF BORNEO.

It is evident also that the people of Borneo were at the time of the conquest in frequent communication with those of Mindanao, Sulu, and the Visayan Islands, as well as with the Tagalogs, whom they infected with their beliefs. At present these relations are of small interest, and very few natives of that island exist in the Philippines.

VARIOUS CASES OF OTHER PEOPLES.

Mention is also made within the time of the Spaniards of various arrivals of embarkations from the Palaos, Caroline, and other islands, as a result of contrary winds or for other reasons. "In 1699," says Father M. de Zuñiga[2] "two canoes which arrived from the Palaos in Samar occupied seventy days in covering the distance of 300 leagues. Their crew consisted of thirty persons, between men and women, and only five men died within the passage. In the year 1725 there was driven on the coast near Baler an embarkation with some twenty men. On other occasions through similar accidents people have come from the Palaos and the Carolines to the Marianes and other islands." Later, in 1749, seventeen embarkations were driven out to sea, only one

[1] See Tierras y Razas del Archipielago Filipino por José de Lacalle. Part II, Chapter II.

[2] Estidismo de las Islas Filipinas ó mis viajes por este pais, por el Padre Fr. Joaquin Martinez de Zuñiga Agustino Calrado; obra extensamente anotada por W. E. Retana. Como lo Madrid, 1893, page 429.

of which made land in Guinan. Other cases like these have occurred more recently. Castes of half European men, which, as may be heard from former and present missionaries, are to be met with sometimes at remote points, may probably be explained in a similar way. We give one of these cases which Father Delgado instances, as it was noted by the first officer of a certain Spanish vessel, Pedro Fernández de Quirós, when Don Antonio de Morga was lieutenant-general of the island: "While sailing along the south coast at about ten degrees we saw an island which we called Magdalena, and from its port there came forth to receive us in sixty boats more than 400 white Indians of very mild disposition, well formed, large, robust, and of good figures. They had fine teeth and eyes, good mouths, very slender hands and feet, straight hair, and many of them were very light colored, among them some very fine-looking boys. This white and ruddy people is judged," adds the above-mentioned father, "to be descended from Europeans formerly shipwrecked among those islands. These people are called Cæsars on account of their beauty and well-regulated bodies."

Here is another case which confirms the preceding. Miguel Lopez de Legazpi had hardly arrived at Cebu when he got tidings of various Spaniards of the first armada who had remained there, where they had married and become citizens, and having sent to a town called Basey in the island of Samar embarkations with ransoms to redeem them, an Indian named Juanes said that the others had died in a certain war, nor did he know more of them.

ORIGIN OF OTHER PEOPLES.

It can not be doubted that there came to the Philippines at different times peoples of other regions, islands, and continents, and this would seem to be indicated by the name barangay, which is here employed to denote a tribe or settlement, because in its primary sense barangay is a launch or boat, and according to traditions, which it is easy to find among the natives, those who came in a barangay formed a separate tribe and were governed only by themselves.

Hence the word "barangay," by which is signified a definite number of families settled at a definite point and affording people sufficient to occupy embarkations of this sort; whereby is also made clear how the natives in part populated the islands by means of barangays directed by their headman, called for this reason "cabeza (head) de barangay."

OBSERVATIONS.

Up to this point we have indicated some of the peoples which probably have come to constitute the population of the Philippines with the certain probable or commonly accepted explanation of their origin. Many other ethnological classes of less importance are characterized by authors which have treated this subject more or less fully. As to this matter, as well as in the discussion of the place of their origin and of the immigration which brought each one of them, there are such different and often such contradictory views that it would require volumes to thoroughly discuss the matter. The truth is that in spite of all this it has not been stated to the satisfaction of the reader how and from whence it has been possible to assemble in this archipelago such a complicated aggregation of peoples and castes as we see to-day.

PLATE III.

MESTIZOS (TAGALOG-SPANISH AND TAGALOG-CHINESE).

THE NEW YORK

ETHNO-GEOGRAPHIC THEORY.

With a view to explaining this confusion and variety there is current a singular opinion which is certainly not well proved, but on the other hand is not impossible, and which on account of its magnificence does not lack interest. Here it is: If one looks at the map, one sees that the Philippine Archipelago seems to be united at the points Unsang and Banguey with Borneo by means of two strings of islands. Still more striking is the line which the Andamon and Nicobar islands, Sumatra, Java, Bali, Lombok, Sumbava, Flores, Timor, etc., form from the Cape Nigres, in the Gulf of Bengal, to New Guinea. These islands are undoubtedly a chain of mountains which run from one extreme to the other. May it not then have happened that all of these islands formed a continent, and that in a horrible cataclysm the waters invaded the plains, leaving only the elevated points visible? On this supposition the inhabitants who had spread into this continent from all the neighboring continents, of various races, separated more or less from each other by natural boundaries, found themselves obliged to take refuge in the mountains, where we see them to-day, isolated and showing a great variety of races and customs. How otherwise can it be explained that the inhabitants of Oceania have communicated with each other? That is not to say that in very remote times they had obtained a civilization similar to ours, of which no sign remains at present. Quite the reverse.

In conformity with this theory Señor Retana explains the origin of the populators of the Philippines as follows:[1]

> This continent, of which scientists tell us, transformed later into great groups of islands, may have been united to the continent of Asia. If this was the case, in very remote times there came from Asia the Aetas, who settled certain regions in the vast territory. If an actual union did not exist, it must have been possible to cross without great difficulty, in view of the proximity between Sumatra and the Peninsula of Malacca, which must have been much greater in bygone times. When the cataclysm occurred, that is to say when there took place the great transformation which geologists recognize, the Aetas or Negritos were the only inhabitants of the Philippines. It should be understood that the period included between the dispersal of the Aetas over the Oceanic Continent, and the breaking up of this continent included some centuries. Time passed and the brown Malays invaded the Philippine Islands as they invaded many others of the Pacific islands.

The reader may use his own judgment as to the plausibility of such an ethno-geographic theory. On the other hand, if he adopts the opinion first expressed, the paths have already been indicated along which the various populators of the islands may have arrived.

EUROPEAN MESTIZOS.

Finally, to the classes of Indians already mentioned there must be added a new class—that of the European mestizos, which in number and in area occupied has gone on increasing since the beginning of Spanish domination. This caste is usually the most important and noble, because it has, if one may say so, in its very blood the nature and the culture of a superior race. Individuals of this sort are to be found in all regions which have been reached by the commerce of Europe, but they are particularly numerous, as may readily be understood, at the capital and in its vicinity, as well as in the various provincial capitals and more important towns.

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[1] Op. cit. Vol. II, App. G, p. 488.

EUROPEAN COLONY.

In the European colony there are representatives of all nations, the Spaniards being the more numerous than the English, the Germans, and the French. Thus it may be said that there are found residing in the islands representatives of almost all the nations of Asia, India, and Europe, and since Manila is the center and head of the whole archipelago and its commerce, it has a diversity in its inhabitants such as is hardly to be met with in any other city of the globe.

CHAPTER IV.

PRELIMINARY CONSIDERATIONS.

It was not without reason that a celebrated naturalist said there was no country like the Philippines for making a complete study of the races of man. Such is the variety of the tribes, some of which are hidden away in the mountains, others of which are scattered about the coast and lowland forests of the archipelago, that it would be difficult to find a land where man presented himself to the eyes of the ethnologist with conditions so extraordinary and worthy of such careful attention. But these peoples seem to be mixed in such a way that it is commonly admitted to be a difficult undertaking to determine their characteristics and analogies with sufficient precision in order to be able to determine definitely the primitive type predominating among each one of them. He who reads will see that many travelers have come to this conclusion after visiting these tropical regions, and have set forth their views in their writings. Nor would their confession be necessary in order to make plain the difficulty which they encounter; for, since they have gone to almost all the different and most remote regions of the globe in order to seek and find the origin of these people, still they disagree in various ways as to the method of grouping the tribes and classifying them among themselves. May it be that they have not made as yet a complete and conscientious study of the material at hand?

Undoubtedly this work would present very great interest not only for history, but also for other important modern sciences. But there are not lacking those who believe that its completion could hardly be attained, on account of a lack of data in regard to the prehistoric periods in which the Oceanic races lived. For the rest, examining carefully the organic characteristics and the physiological peculiarities which the numerous tribes present who, as a matter of fact, inhabit the Philippine Islands, some of them being savages and others civilized, special and distinctive conditions may be deduced of such a nature as to serve as a basis and foundation for a satisfactory classification.

VARIOUS ETHNOLOGICAL CONDITIONS.

Before presenting what it has seemed best to adopt, we will make a brief summary of some of the opinions of other authors.

There are those who maintain that three trunks have given origin to the inhabitants which people the Oceanic Islands—the Malayans, Melanesians, and Polynesians. The author who has already been cited, Don José de Lacalle, with the purpose, as he says, of leaving intact the

problem of the Philippine races, admits the following distinction: He first considers by itself and describes the black and aboriginal race, separate from the other peoples by well-determined characteristics, and he thus includes the remaining peoples under two great groups, conveniently known as "pagan-mestizo" tribes and "Christianized" peoples, a division established solely on the basis of the intellectual condition of the peoples and their religious beliefs.

There are other authors who reduce the various native inhabitants of the Philippines to only two branches—the Negrito and the Malay. Among these should be mentioned F. Blumentritt, who, in his Vademecum,[1] divides all of the Philippine peoples into three groups; that is, tribes of the Malay race, tribes of the Negrito or Aeta race, and mixed tribes of Malayan-Negrito origin.

Finally, the English naturalist, Wallace, and the Dutch, H. Kern, and Robide, maintain that the Papuans and the Malays belong to the same race, founding this proposition on the study of their languages. Señor Retana, who has already been mentioned, inclines somewhat to this view, which affiliates under a single mother race, namely, the Malay race of the native races of the Philippines.[2]

CLASSIFICATION WHICH WE ADOPT.

In this way we might go on stating in order the various views as to the classification of these peoples; but, in order to avoid prolixity, we come immediately to the statement which has seemed to us preferable, and which we simply advance as the one adopted by Dr. Montano after the studies which he made on his celebrated trip through these islands. It is first given as he himself sets it forth.[3]

> The peninsula of Malacca and the whole of the great Asiatic archipelago to the east of Flores, Cerám, Gilolo, or, if you please, the limit of the Papuan race, seems to be populated by three very distinct races, namely, the Negrito, the Indonesian, and the Malay. At all events, this is the conclusion which I have reached from my observations of the human beings inhabiting this region to-day, and from my conclusions which have been gathered in all of the regions that I have traveled through.

The distribution of these races might well be represented according to the author cited by means of three concentric zones, the interior one occupied by the Negrito, driven back toward the centers of the lands which they inhabited by the Indonesian invasion. The second zone occupied by the latter tribe, dislodged in their turn from the coast regions by the Malays, who are almost the only inhabitants in the exterior zone, and are found scattered about everywhere on the coasts.

OBSERVATIONS.

In Map No. 3 of the Atlas of the Philippines it may be seen how we represent the various races scattered throughout the different regions of the Philippine group, under the three tribes above men-

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[1] Vademecum etnográfico de Filipinas. Madrid, Establecimiento tipografico de Fortanet.

[2] See the work cited, Estradismo de las Islas Filipinas. Appendix G., pages 488–492.

[3] In the work, Rapport á M. le Ministre de l instruction publique sur une Mission aux isles Philippines et en Malaisie (1879–1881) par M. le Docteur T. Montano. Cap. III.

tioned. In respect to the latter we must state that on account of the great difficulty above set forth in determining the primitive and dominant type in which one of the peoples have not always been assigned to the various races with such certainty that it might not prove that they belonged to a different one, for it must be known that these races are profoundly modified by the large amount of intermarriage which has inevitably come about during many centuries of piracy, continuous warfares, slavery, and more or less commerce between the various tribes, as well as between them and the countries from which they came.

Wherefore in this classification which we adopt, and which seems best to carry out our undertaking of classifying the different Philippine peoples, we note the most conspicuous type of each class, but we especially note the organization and distinctive peculiarities which the people that populate the Philippine soil at present show, leaving for later and detailed investigations the determination, without uncertainty as to what shall be finally the true ethnographical definition which should be applied to these natives.

A description of each one of the groups named will form the subject-matter of the second part of this treatise, in which there will be given, first, the general characteristics of the races, and, second, the peculiarities of each people or tribe of the same.

Finally, there may be seen in the same Map No. 3 another classification, which, under another form, includes all the natives of the archipelago, in the three following groups: First, the tribes that have long been Christianized; second, Pagans and very recently Christianized peoples; third, Mohammedans.

PART II.

CHARACTERISTICS OF THE RACES INHABITING THE PHILIPPINES.

CHAPTER I.

GENERAL CHARACTERISTICS.

Among the various inhabitants of the Philippines it is certain that the Negritos alone present well-marked racial characteristics by which it is easy to separate them from all the rest, although one can not fail to note in them certain indications of the inevitable influence of the other races which have invaded the country.

Dr. Montano describes them as follows:

The Negritos attract attention at the first glance on account of the relatively large size of the head, the lack of trognathism, and the elevation of the cheek bone. Their general aspect is that of a weak people. The thorax is slightly developed, the legs lack well-developed calves. The feet, which are quite clumsy and large, are somewhat turned in, the direction being exaggerated on account of the position of the great toe, which is conspicuously separated from the others, which are very short. The abdominal wall, which is very firm, has a semispherical form. The opening of the eye is usually prolonged and rectilinear, although it sometimes describes a somewhat pronounced curve. The sickle-shaped fold is lacking, although the internal prolongation of the upper eyelid tends to form a fold which appears to be its rudiment.

They distinguish colors well, although they lack words for naming them. The forehead is notably high and vertical, and forms a very distinct angle with the transverse plane of the face. The antero-posterior curvature of the skull is circular in general, and is quite high. The same is true of the transverse curve. The posterior region of the head is always more or less flat, and not infrequently even depressed in the center of the right side, this being in relationship with the flow of the humors (?).

The hair is abundant and very fine, crisp, and closely curled, and implanted in groups of hairs regularly scattered over the scalp. It grows white before the age of 50 years. The cross section of a hair is frequently ellipitical, not kidney shaped, and sometimes rather ovoid.

The beard, which presents the same characteristics as the hair, is sometimes thick, and in that case covers the whole lower jaw, as well as the upper lip. More frequently it is thin and limited to the region of the upper lip to the mentum, and to the upper part of the ascending branch of the mandibula.

The color of the eyes does not correspond exactly to any of the colors of the chromatic scale. Irregularities of the implantation of the teeth are frequent, especially in the case of the incisors, but this is much less frequent than ulceration, almost always limited to the molars and to be observed in different stages of development in almost all individuals. The superior incisors are more frequently filed to a point, the oblique and lateral part of the tooth including two-thirds of its free portion.

Comparison with the Papuans.—To the preceding description we consider it opportune to add another from a recent work,[1] in order

[1] Tierras y razas, por Jose de Lacalle.

that the principal characteristics of the Negritos may be compared with those presented by the Papuans in New Guinea, and at the same time to take up and consider the osteological studies of Virchow and other ethnologists. It is to be noted that the author is not in conformity with those who represent the Negritos as having ill-proportioned, weak, and poorly organized bodies, these characteristics pertaining only to certain individuals, on account of their way of life and local conditions in general. He gives the following account:

The body of the Negrito is regularly formed. Their height varies from 1.30 to 1.57 meters, being less in the case of the women. In general it may be said to be a race of small people, and it is to be noted that during the early years of life growth is more rapid than during the second period. The constitution of the Aetas is closely related to their nomadic and savage customs. The muscular system is well developed, and the extremities are strong and slender. The skin is more delicate and softer to the touch than that of the Papuans of New Guinea, and it has a brownish-black color, which without equaling the brilliant black of the peoples of Africa, is more intense than that which is seen among the other inhabitants of the Philippines. The head is covered with abundant hair, which is crisp and of a sooty black color. Like the blacks of New Guinea, they have the face almost round, the lips thick and the medium sized nose, flattened and broad at its base. The slight prognathism observable in this race is remarkable. The teeth are well formed and the beard is short. The forehead is broad, and the eyebrows very pronounced. In the dark and brilliant eye one notes an uneasy look, which changes to a sinister gleam in moments of excitement.

Desiring to study Negrito skulls, we attempted on various occasions to obtain them, but did not succeed in examining more than five. These belonged to the tribe in the east of Luzon. We do not believe that the data obtained from the study of so small a number are sufficient to establish general principles, nevertheless we must give them, assigning to them such importance as they actually have. A careful examination of these skulls has shown their similarity with skulls of Papuans, and we at once include them in the dolico-cephalic variety, for although certain small differences are noted they do not affect the general type. In two of them the parietals formed a marked eminence at their point of union, but this has sometimes been found in the hipsisteno-cephalic skulls described by Davis from Papuan geletine. The frontal bones were flattened in their lateral portion and the occipital presented great convexity. The horizontal cranial index varied from 71.45 to 73.56, and the vertical from 72 to 73.6. The average capacity of the five skulls was 1.390 cubic centimeters, which demonstrates the fact that the development of the cephalic mass is not so scant as some authors have supposed. The arbitrary index did not in any of them exceed 86, from which we conclude that the Negritos must be considered among the "mesosemas" of Broca. The arrangement of the zygmotic arches places these skulls among the criptozygic or skulls with slightly prominent cheek bones. The mandibule differ somewhat from those of the Papuans, the prognathism is not marked. Finally the nasal index gives an average of 57.10.

REPLY TO OPPOSING ARGUMENTS.

The study of these remains makes it possible for us to combat the conclusions of various other ethnologists. The former examined only two skulls, whose antecedents were not above suspicion, and concluded that there was sufficient reason for separating this race from the other races of Oceania, and R. Virchow, accepting this opinion, and supporting himself on the statements of certain travelers, and on the examination of a single skull collected by Scheteling, hastened to change his previous statement concerning the characteristics of the Negritos, and said that no relationship could be made out between the Philippine peoples and others of Melenasia and Australia. On the other hand, this author does not find it impossible to accept the species of Davis, who admits as aboriginal certain white tribes now extinct. Virchow certainly believes that mere suppositions have been carried too far; but even so, we do not see how certain theories have been able to make headway on the basis of the study of three or four skulls which assuredly were not those of true Negritos. In proof of this it may be noted that Scheteling dug up at the south of Luzon a skull which, according to his own admission, belonged to a tribe with an admixture of Bicol blood. As to the skulls studied by Davis, Virchow himself says that Davis did not give concrete information as to their origin. It is seen, then, that authority may be given to conclusions derived from very uncertain data.

AETAS OF MARIVELES (PROVINCE OF BATAAN, LUZON).

THE

Furthermore, the German savant falls into errors which are the result of untrue statements of certain travelers. Thus we note that in speaking of Negrito crania brought from the Philippines since 1872, he does not hesitate to state that they belonged to a bracacephalic race, in flat contradiction of what he first wrote. He uses the words "ancient and modern Philippine crania," referring to the material obtained by Jagor in the caves of Nipanipa pertain to a bracacephalic people which have nothing in common with the Negritos, because these are distinguished by the small breadth and the great length of the skull, and thus are dolico-cephalic. For the rest, on reading what Virchow says of the bracacephalic crania, one understands how great is the error of those who believe that they belong to the pure black race of the archipelago, which, as Semper has demonstrated, and as we ourselves have proved by the material which we examined, are distinguished by the lack of prognathism, while those examined by the German professor are, as he says, strongly prognathic.

The authority of a savant like Virchow naturally carries much weight, but if we stop to consider that his fine descriptions are not based on the bones of pure Negritos, we shall have to admit that they lack great ethnological value. It is certain that if one examines the skulls of the Balugas of Pangasinan and of the other mestizo black tribes of Luzon and Mindanao, these differences will be met with, in distinction from those collected by Dabis and Scheteling, and employed by Virchow to separate the Aetas of the archipelago from other peoples with whom they no doubt have very complete resemblance. Perhaps to this circumstance also it is due that the illustrious Quatrefarges includes the Aetas in the group of subbracacephalic Negritos, likening them to the Mincopies of the Andaman Islands and to the Semangs of Malacca, with whom we do not believe that they have any relationship.

The remains which we have examined, the origin of which is well known to us, do not essentially differ from those which Meyer collected in the gulf of Geelirmk in New Guinea. As to the differences which separate them from Australian skulls, we must state that they are definite when compared with the tribes having straight hair, but disappear when comparison is made with the Papuans with curly hair which inhabit Australia and whose cranial capacity reaches 1.400 to 1.450 cubic centimeters. Nor do the small variations which we have indicated in describing crania from Luzon bear great significance. In those which come from the Gulf of Astrolabio, examined by Virchow himself, such differences are indicated, and they are frequent both in the skeleton and in the color of the skin and the facial characteristics in the whole Papuan race.

The error of Scheteling and Davis, as well as that of many other travelers and naturalists, lies in accepting for remains of Aetas those of black tribes which in more or less remote times have crossed with other peoples of the archipelago. It would be well for observers to take this circumstance carefully into account, as Semper has long since noted it.

In general the Aetas, while they do not attain to the morphological perfection of other races, are superior to the blacks of Australia and even to many Polynesians. Although being compelled to live in the forests and compelled to forego the frequent forays in which they engaged in other times, they present to-day indications of the fact that they have been dominated by other men.

So much for their general characteristics.

DIVISION OF THE RACE.

We now come to the division of the race. We consider it to be divided into two subgroups, namely, Negritos of pure blood, and Negritos of mixed origin. In the first group we include the Negritos of the province of Bataan, in Luzon, and the Mamanuas.

THE MAMANUAS.

As the Jesuit missionaries who worked among them have noted, these are the true aborigines of Mindanao and the only Negritos which are to be found in the island. They live a nomadic life in the eastern Cordillera from Surigao to Tago, inclusive. To-day, thanks to the labors of the fathers, many of them have been brought together and have founded settlements around Lake Mainit and the Jabonga River, where they lead a social life, and are gradually becoming accustomed

to work and to civil and religious civilization. They are distinguished especially by their height, by a certain lack of proportion between their limbs, and by their hair. They are short; they are inclined to be corpulent, which is the more surprising since their bodies are in general weak. Their arms are long and their legs somewhat short, and their hair is crisp and entangled.

Montano states that these blacks resemble in their physical characteristics those which inhabit Mariveles, with only this difference, that the latter are not surrounded by pagan races which war upon them, while those of Mindanao are continually maltreated by the Manobos.

THE MESTIZO NEGRITOS OF ALBAY.

Of the Negritos pertaining to the second subgroup the best known are those of the province of Albay. Mantano describes them as follows:

In the southeastern extremity of Luzon, in the province of Albay, near the hot springs of Tibig and in the vicinity of Malinao, there dwell Negritos with a mixture of Malay blood. Their medium height is 1.5036 meters, nearly that of the Negritos of Mariveles, which is 1.4853 meters.

These Negritos of mixed descent are much stronger and better muscled than the pure Negritos of Mariveles; their hair is much less crisp. In certain individuals it is hardly curled. The color of the skin is less dark. Their teeth are not destroyed, and it is unusual among them to find a case of irregular implantation. The smallness of their size, the nasal fosse dilated transversely and turned forward, the lobule of the nose, the extremity of which is gently curved downward, the slight sinuosity of the eye slit, the medium development or absolute lack of the sickle-shaped fold cause them to appear notably similar to the Negritos of pure blood. The same intermediate characteristics are noted in their intellectual development and their customs.

MANY OTHER SORTS.

Among the Mestizo Negritos there must be included many other tribes whose characteristics are as yet not well understood or wholly unknown. These tribes bear various names, as follows: The name Negritos is applied to the blacks of pure and mixed blood, who inhabit the region from the eastern Cordillera of North Luzon to the Pacific coast, as well as to those of North and South Ilocos, Nueva Ecija, Tayabas, Ambos, Camarines, and Iloilo, island of Panay. The Pagans, who seem to be blacks of pure blood, found in Mindoro and in the neighboring islands or tablas Masbate and Ticao, are called Manguianes.

In Pangasinan and Zambales the blacks of the mountain regions are called Aetas.

The Buquiles are the Mestizo Negritos inhabiting Zambales, in Luzon, and the vicinity of Baco and Subaan, in Mindoro. They have thick, woolly hair, and broad, flat noses. The color of their skin is somewhat lighter than that of Nigritos of pure blood.

In Palawan the blacks are called Igorrotes. They seem to be of quite pure blood. They have black skins, crisp hair, well-formed, athletic bodies, and are some 2,000 in number.

Finally, the name Attas is applied to the blacks of the eastern Cordillera, in the province of Cagayan, island of Luzon. Concerning them Father Pedro de Medio, a Dominican, makes the following statement:

In the Cordillera which traverses the eastern coast to the Pacific in the province of Cagayan there abound Negritos or Attas, who are ordinarily of lower stature than are the Indians or Calingas. Their cheek bones are more prominent, and their color is much darker, although not so black as that of Africans. Their hair is thick and

woolly both in the case of women and in that of men. The women take delight in letting it grow out in all directions from the head without tying it up or causing it to hang down the back. It is so curly that it never seems to have more than a quarter of its actual length. Being very thick, it forms a sort of rude aureole. The Negritos of this region may be subdivided into two classes. The one class leads a completely nomadic life; the other forms a quite permanent settlement.

As to the Negritos of the island of Negros, the Recoleto father, Navarro, makes the following statement:

In the northern and eastern parts of the islands Negritos wander through the mountains. They have black skins, thick hair, and very weak bodies. In Calatrava there are thousands of them.

They were so numerous in this island at the time of the arrival of the Spaniards that the latter changed its original name, "Buglás," to "Isla de Negros" (Island of Blacks).

There follows a synoptical table, in which will be found set forth what we have stated in regard to the Negrito race and its distribution throughout the archipelago.

Race.	Local name.	Habitat.
Pure	Negritos	Province of Bataan, island of Luzon.
	Mamanuas	Shores of Mainet Lake, northeastern Mindanao, Peninsula of Surrigao, and the coast mountain chain on the Pacific down to Tago.
Mixed (Mestizo)	Negritos	Vicinity of Pilig, Albay Province, southeast Luzon.
Negrito	Negritos	North Ilocos.
	Negritos	South Ilocos.
	Negritos	Tayabas.
	Negritos	North Camarines (mountains of Capalonga, Mambulag, Paracala, Bacod, etc.).
	Negritos	Nueva Ecija.
	Negritos	Iloilo.
	Negritos	Negros.
	Negritos	Vicinity of Iriga (South Camarines).
	Negritos	Albay.
Pure or mixed (not certainly known).	Manguianes	Mindoro.
	Manguianes	Tablas.
	Manguianes	Masbate.
	Manguianes	Ticao.
	Aetas	Pangasinan.
	Aetas	Zambales.
	Buquiles	Mindoro.
	Buquiles	Zambales.
	Igorrotes	Baluan.
	Attas	Province of Cajoian in Luzon and the eastern mountain chain down to the Pacific coast.

CHAPTER II.

GENERAL CHARACTERISTICS.

Dr. Montano indicates as physical characteristics common to all Indonesian tribes—

Their considerable height, their muscular development, and the prominence of the occipital region, which forms a great contrast to the flattening characteristic of the Malayan race in general, and especially of its Philippine representatives. They have, furthermore, high foreheads, aquiline noses slightly curved, wavy hair, and abundant beard. The color of the skin is quite light; the individuals are clever and intelligent.

With the exception of the Bilanas, of the island of Mindanao, all of the natives who are not Negritos or Malays have strong constitutions and enjoy a high degree of good health. The old people, as I have been able to prove in various cases, reach an advanced age without infirmities.

All of the Indonesian tribes, even the most modified types, file their teeth. I have never seen but one tribe adopt the definite and special mode of doing it, however; in general, the part of the tooth filed away is considerable.

Ulceration of the molars is frequent, and more noticeable even than among the Bicols. The practice of chewing betel nut and tobacco is widespread among them, and even when they are not chewing it, men and women keep it in reserve between the upper lip and the incisors.

Nearly all the tribes pierce the lobules of the ears. At first the opening is small, but little by little they make it larger, introducing round pieces of dugong bone, using larger and larger pieces until the openings finally reach a diameter of 2 or 3 centimeters.

Tattooing is especially common among the tribes near the Gulf of Davao. Mothers practice it on their children when 5 to 6 years of age for the purpose of placing an indelible mark on them, in order that they may know them if they are stolen or snatched away from them, as frequently happens. The instrument which they employ is not a conical point, but the tip of the blade of a knife. The little incisions made by it are always readily recognized.

The color is given by exposing the skin to the smoke of different resins, at least so the Pagans told me, although they never allowed me to witness the operation.

INDONESIAN TRIBES.

Passing on now to a consideration of the tribes into which the Indonesian race may be divided, we must state that while we accept the tribes indicated by Montano, and assign to them almost the same characteristics which he gave, we add various others, which, while closely related to them, have differences worthy of consideration. Such are the Atás, Mamguangas, Dulanganes, Tagabalies, Subanos, Tiruraves, and Caláganes.

The Samales inhabit the island of this name, situated in the Gulf of Davao. They have broad shoulders and are relatively tall, exceeding 1,680 millimeters; the calf of the leg is hard and prominent; the hands and feet are strong without being large; the brachycephalic skull lacks much of being as flat as in the Visayans; the alvelor prognathism is considerable; the nose is short and prominent, with its lobule flattened; the cheek bones are very prominent, especially laterally, producing a characteristic appearance almost feline, which is accentuated by rough and quite abundant hair on the upper lip and the chin; the long hair is not extremely thick.

The individuals of this tribe are for the most part Moro-Mandaya Mestizo, and number some 2,000.

The Bagobos inhabit the central and eastern portion of Mount Apo. They are tall, reaching a height of 1,750 millimeters; they are strong and robust and take advantage of their strength to impose on their neighbors. Their profile is effeminate, boys and girls being indistinguishable, and the latter having the vigor of the former; the nose is straight and the prognathism is very variable; the sickle-shaped fold is usually more pronounced than in the Moros; the transverse axis of the eye is straight and does not present the slightest obliqueness from below and within.

The Bagobos number some 12,000.

The Guiangas who inhabit the northern and eastern slopes of Mount Apo are in all respect similar to the Bagobos. They are divided between the rivers and settlements of Gueilan, Guimalan, Tamugan, Saeril, and Biao. They speak a language different from that of the other tribes. Guiangas are also found along the river Mala and its tributaries. According to the Jesuit Father Gisbert, who did missionary work among them, they number approximately 6,400.

PLATE V.

TAGACAOLOS.
(Living on the Bay of Dávao.)

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The Atas inhabit the regions to the eastward of Mount Apo and to the northwest. They are of a superior type, and this is especially true of their chiefs, who have aquiline noses, thick beards, and are tall. They are very brave and hold their own with the Moros. Their probable number is 8,000.

The Tagacaolos live on the Gulf of Davao from the cove of Casilaran down to a little below the river Lais, and also the right side of the upper part of the little peninsular which ends in the point called San Augustin. They are of good height, and robust.

The antero-posterio part of the skull is, as a general rule, curved or slightly flattened in its posterior portion, and does not present the projecting occipital portion which is to be observed in the neighboring Bilianes. The prognathism is moderate. The face is long, with projecting cheek bones forming an elongated rhomb. The eyes are frequently obliquely inclined downward and inward, the nose is straight and quite prominent, and the lobule recurved downward and backward, giving a pleasant expression to the face. The beard is notably thick, and appears at a comparatively early age; the color is quite light.

To the north of the Gulf of Davao, between the rivers Sálug, Hijo, and Agusan, live the Tagabauas, a mixed tribe, with Bagobo, Manobo, and Pagacalo blood. They have the characters of these various peoples, sometimes side by side, sometimes confused with each other. Their color is frequently dark. They are few in numbers and lead a wretched life.

The Manobos live to the number of some 20,000 in the vast valley of the river Agusan, and in smaller numbers to the north of the Bay of Malalog, Gulf of Davao, and also on Cape St. Augustine, and finally at various points in the interior of the district of Cottabatto.

It is the most numerous, powerful, and fierce of the Indonesian races. It presents two very distinct types. The first is characterized by a tall stature of some 1,705 millimeters and by its almost athletic build; its forehead is high, nose aquiline, slightly curved. The hair is very slightly curled, the beard abundant, and the color of the skin quite light. This is the type most similar to the Indonesian or pure race.

The Manobos of the second class have very dark skins and are not nearly so tall. The nose is straight and shorter. The nasal fossæ are sometimes very narrow and are developed laterally. The antero-posterio portion of the skull is more developed than its occipital portion.

The greater part of the skulls found in the caves of the Islet Magbulacao, near Dinigat, those of the cave of Tinaga, on a small island quite near Taganaan, and those of two other caves of Cabatuan, on Mainet Lake, belong to the Manobo tribe, as well as do the greater part of the Christian converts which people the peninsula of Suriga.

The Mandayas live in the valley of the river Salug and along the eastern coast of the island of Mindanao from Tandag to Mati. They are the most numerous tribe, with the exception of the Manobos. The other pagans consider them the oldest and most illustrious people. They are distinguished from the various other Indonesian tribes by three characteristics: First, the rectilinear direction of the median portion of the antero-posterio cranial curve; second, by the breadth of the eye slit, which is almond-shaped. Their eyelashes are very dark and long, giving them a peculiar expression. Third, by the special color of their skin, which is rather an ashy gray than a yellow gray, due, possibly to some admixture of Negrito blood. The nose is

straight and prominent; its nasal fossæ are not flattened out, although they appear so at first glance on account of not being horizontal, but oblique from below backward on their lower border. The eyebrows are not thick, and the beard is only moderately so, and they almost always wear both shaved. The hair is very abundant and grows white at an age which does not seem very advanced. Sometimes there is noted among them an occipital flattening peculiar to the Malays, and also the facial characteristics of the Bilanes. In general, their prognathism is little marked. In the external adornment of their houses, which are of a special form, they resemble the Dyaks of central Borneo. In 1887 Father Pastello estimated their number at approximately 30,000.

The Bilanes live in the vicinity of Lake Bulúan, to the west, the south, and the east, extending to the end of the little peninsula which terminates in Punguian Point. Those of them who live hidden away in the mountain peaks of the eastern Cordillera, between Soböy and Malálag, are usually the victims and slaves of all the neighboring tribes. They seem to be as wretched as the Mamanuas, and even inferior to them in intellectual capacity, but the Bilanes of the Sarangani Islands, called Balud and Tumánao, are held in great respect on account of their robustness and proverbial valor. No less than 1,500 persons reside in the two small islands mentioned.

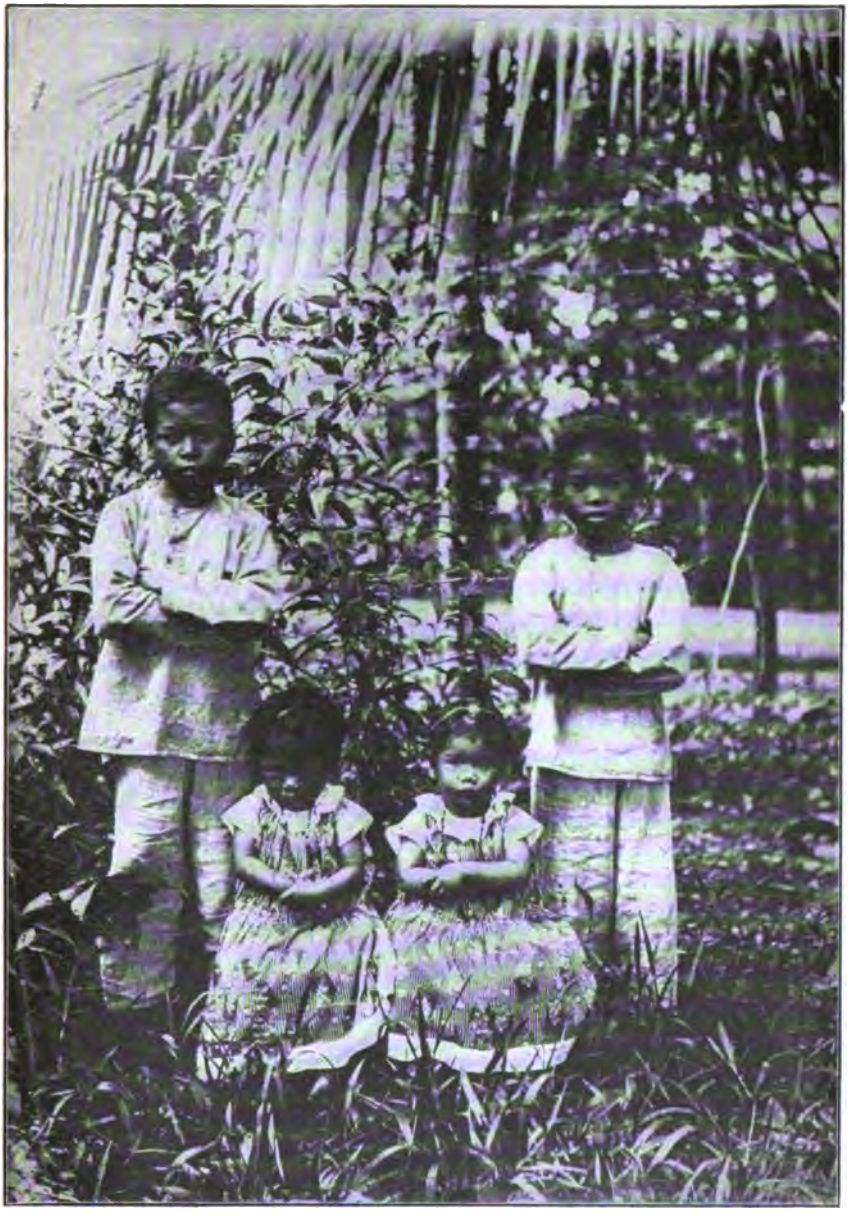
The Manguangas inhabit the upper part of the Rio Sálug and extend to the east and west of it. They are of small stature and stubby form. Their skulls are notable for their antero-posterior elongation, and for the flattening of the antero-posterior curve, which, at the level of the superior portion of the occipital, is very great. The forehead, which is very prominent, forms, with the broad and flattened face, a diedral angle. The nose is sunken and the nasal fossæ are very broad. The prognathism is considerable. The lower maxillary, which is very prominent, is prolonged forward in the same way as the upper, which augments the depression of the median facial region. The hair is straight, coarse, and abundant. The beard, which is thin, develops at the age of 35 to 40 years. The Manguangas are warlike, and are continually quarreling with the Manobos and Mandayas of the Angusan, with the Moros of the river Hijo, and with the Bagobos of the Apo. They are of good disposition, and in this respect resemble the Mandayas.

The Dulanganes inhabit the forests and mountains extending some 15 leagues from Tamontaca toward the south-southeast coast. They are so savage and fierce that even the Moros are afraid of them, and call them bad people.

The Tagabalies inhabit the region to the south of Lake Bulúan as far as Sarangani Gulf. They are an unconquered people, warlike, and hostile toward their neighbors, the Moros, Bilanes, and Manobos, with whom they frequently fight.

The Monteses, or Buguidnones, are found in the district of Misamis, and constitute one of the most important tribes of Mindanao. They live for the most part in the valley of Tagoan, in the northern part of the island, but are sometimes met with in the mountains near Point Dinata, and even a little before that point in the mountains near Nasipit, and extending to the river Odiungan, behind Mount Balatocan, and as far as the source of the Polungui and the territory of Dato Mapondo, continuing to Lake Lanao and Point Sulanan.

PLATE VI.



DULANGANES CHILDREN.

The above were taken in the mountains near Lebac and educated in the Orphanage of Tamontaca (Cotabato).

Many of them show the influence of Malayan blood, while others have Negroid characteristics. In the former the forehead is often high and sometimes prominent. The nose is straight and narrow in its upper portion and broad in its lower. The eye slit is horizontal or slightly inclined, with eyebrows somewhat conspicuous. The face is oval and moderately broad with considerable prognathism. They are of good height and of graceful and even pleasing proportions. As a rule, they are of an approachable character, and are possessed of good understanding. Some of them are singularly able and cultured, and if one were to judge by their frankness and naturalness in their intercourse with others he would not say that they were pagans. As to their number, it is probably approximately 13,000.

The Subanos occupy nearly the whole of the peninsula of Sebuqui up to the vicinity of Zamboanga, and they are neighbors of the Moros of Lanao and Illana Bay. Many of the members of this tribe show the influence of Malayan blood, and the type of those in the north is slightly different from that of those in the south. There are among them some fine specimens. As a rule, their faces are rather broad, and their eyes slightly inclined. Unfortunately the people of this tribe have for a very long time been exploited and oppressed by the Moros, as a result of which they are a degenerate people. They are long-suffering and pacific, and are not accustomed to the use of arms.

The Tirurayes people have the Dulanganes for neighbors on the south, and inhabit the region from the lower branch of the Rio Grande down to a little below the Trampadidu. On the coast, and especially in the interior or eastern portion of their territory, they come in contact with the Moros called Maguindanaos, who have cowed them and hold them under their domination. Their number may be some 10,000.

The Cataganes live in part on the river Digos. They are altogether some 300. They do not speak the Sulu language, nor do they profess Mohammedanism. They are pagans, like the other pagans of the Gulf of Davao. Their average stature is 1.665 meters.

The data which we have set forth will be found summed up in the following ethnological table:

Local name.	Habitat.
Pure or nearly pure:	
Bagobos	The foothills east and south of the volcano Apo.
Gulangas	The northeast slopes of Apo, and the steep slopes near Davao.
Atás	The regions west and northwest of Mount Apo.
Tagacaolos	The Gulf of Davao, from Malálag to the river Lais, and in the northern part of the peninsula of Cape San Augustin.
Manobos	Very numerous in the valley of the river Agusan, in much smaller numbers to the north of the Bay of Malalag, Gulf of Davao, on Cape San Augustin, and in the district of Cottabato.
Mandayas	Valley of the river Sálug, and the eastern coast of the island of Mindanao, from Tándag to Mati.
Caláganes	Cove of Casilaran, Gulf of Davao.
Mixed:	
Sámales	Island of the same name in the Gulf of Davao.
Tagabauas	To the northward of the Gulf of Davao.
Bilanes	Two of the Sarangani Islands, and the eastern shores of Lake Buluan.
Manguangas	Branches of the river Sálug to the north of the Gulf of Davao.
Dulanganes	The forests and mountains distant some 15 leagues from Tamontaca toward the south-southwest coast.
Tagabelies	Western shores of Lake Bulúan.
Monteses	In the northern part of Mindanao, in the region between Point Diuata, Point Sulauan, and the sources of the river Pulangui.
Subanos	Nearly the whole of Sibuguey Peninsula.
Tirurayes	From the lower branch of the Rio Grande to the river Trampadidu.

CHAPTER III.

MORE IMPORTANT CHARACTERISTICS.

The Maayan race in the Philippines is very difficult to characterize, because it is at present not found in any part of the archipelago in a pure state, but is always more or less mixed with other races. On the whole, its principal characteristics seem to be as follows:

The Malays are not so tall as are the Indonesians. Their skin is of a darker color. The nose is shorter and straighter. The nasal fossæ are longer and broader. The antero-posterio curve of the skull is more developed in its occipital region. The eyes are black and brilliant, with thick, curved eyebrows and long eyelashes. The mouth is in general from medium to large size and thick lipped. The hair is black, thick, and straight; it is coarse and abundant. The Malays have their muscles and legs delicate, and their feet are small.

DIVISIONS OF THE RACE.

In spite of the numerous varieties of the Malayan race, we agree with Dr. Montano in reducing them to three subraces, under which we include the numerous tribes. The Malays in whose veins there is a certain amount of Negrito blood belong to the first subrace. To the second we assign the Malays who show marked indications of Chinese blood. Finally, we include under the third subrace the Malays who show indication of possessing Arabic or Indonesian blood.

FIRST SUBRACE.

MALAY NEGRITOS.

This subrace is the more numerous of the three. Dr. Montano, who has studied it in the case of the Atás of Ambos Camarines, in southern Luzon, makes the following statement concerning it:

In the forests of the steep Cordillera of southeastern Luzon, which extends through the provinces of Tayabas, Ambos Camarines, and Albay, there dwells a race of very mixed origin, which the other natives call by the name Atás (refugees or pagans), without paying any attention to the race to which they belong. Among these groups of people not as yet subdued, many of whom live a nomadic life and who inhabit the inaccessible region above mentioned, many owe their origin to Indians who have fled from their towns on account of crimes.

In the provinces above mentioned the Atás have a great reputation for strength and ferocity, and apparently with only too good reasons. The two Atás whom I saw were undoubtedly Indians with a large amount of the Negrito blood.

These two individuals were well muscled, and their large black eyes gave an expression of cautious ferocity. The eye slit was slightly oblique and greatly elongated, the sickle-shaped fold very well developed. In my description I place them after the tribes of Malacca, for they, like this people, seem to form a combination between the true Negrito mestizo and the Malays. The Atás of Camarines and the adjacent provinces, causing great trouble as they do by their robberies, are destined to disappear even more promptly than the Negritos themselves.

The Irayas inhabit the banks of the river Ilaron and the eastern slopes of the Sierra Madre on the side of the provinces of Nueva Viscaya, Isabela, and Cagayan de Luzon.

The Itetapanes are contiguous on the south with the Igorrotes of Benguet, on the north with the Guinaanes, and on the west with Búsaos.

TIRURAYES.
Types of those of the mountains near the Rio Grande.

They are of low stature, but well formed. The nose is coarse and very broad, the eyes black and round.

The Gaddanes dwell to the northward of the Igugaos, from the river Mágat to the vicinity of the river Chico of Cagayan de Luzon. The color of their skin is very dark.

The Ilongotes inhabit the rough mountain side of South Caraballo, on the northern limit of the province of Nueva Ecija. They are also to be found in Caraballo de Baler, and in Cassiguran, in the district of Principe. They are well proportioned, robust, tall, and strong. Their color is dark.

The Balugas inhabit the eastern Cordillera of Nueva Ecija and the mountains bordering upon Tarlac and Pampanga. They also extend through the heights of Mauban, through certain regions in Tayabas, through the Cordillera of Zambales, and the eastern mountains of the two Ilocos provinces.

The Dumangas are confined to the region of the Pacific coast from Baler and Cassiguran to the northward. They may also be met with on the eastern slope of the Grand Cordillera.

The Ibilaos and Italones.—The people of these two tribes are neighbors of the Ilongotes, from whom they differ but little. It may well be that in all three tribes there is some Indonesian or other blood.

The Manguianes (*Mangynas*).—By this name it is customary to indicate various pagans in the island of Mindoro. Different authors have applied the name to the Negritos, to the Malay Negritos, as well as to the Malay Chinese and the Malay Caucasians, all of which peoples inhabit this island. The Manguianes here referred to dwell between Abra, Ilog, and Pinamálayan. The color of their bodies is rather dark. Their hair is loose. They have prominent cheek bones and flattened foreheads. The nose is somewhat elongated.

We will now consider various other tribes of the island of Mindoro. On the borders of Socol and Bulalacao there is a tribe called Manguianes. In the plains of the above-mentioned regions live the Bangot tribe. In the foothills of the mountains of Socol and Bulalacao dwell the Buquiles, while the Beribes inhabit the peaks. In Pinamálayan they call those who inhabit the coasts Bongots; those of the plains, Buquiles; those of the foothills, Tadianan; and those of the peaks, Durugnum or Buctulan; those of the high ground of Naujan are called Tiron. Also, in Mangarin they apply the name Buquiles to those who inhabit the shores, Lactan to those of the plains, Manguianes to those of the foothills, and Baranganes to those of the mountains.

In the island of Tablas there are also so-called Manguianes, said to resemble those of Mindoro.

What we have just said may, perhaps, serve as a base for someone to clear up this whole matter. There are those who do not admit any such variety of peoples in Mindoro.

The Isinayes inhabit various parts of the island of Panay.

The Guinaanes, or *Guinanes*, are the Malay Negritos of the province of Abra.

The Tinguianes live to the westward of them. To the eastward they are bounded by the crests of Caraballo. To the south are the Ytetapaanes, and to the north the Apayaos.

The Allabanes are a tribe inhabiting the island of Panay. Nothing is known concerning them.

The Apayaos live to the north of the Guinaanes from North Ilocos to the highest part of the Grand Cordillera. They also occur on the eastern slopes of the same mountain chain on the side of the province of Cagayan.

The Catatangis are another unknown tribe of the island of Panay.

The Adaugtas dwell in the extreme northern portion of the Cordillera of the Caraballos in the province of North Ilocos.

The Abunlon constitute another Malay-Negrito tribe of the Zambales Mountains.

The Calauas, or *Calaguas*, inhabit the heights in the neighborhood of Malaueg and the ravines of the river Chico, in the region of Itaves, province of Cagayan de Luzon.

The Quianganes are a tribe of Malay Negritos inhabiting the mountains of Nueva Vizcaya.

The Calingas.—We borrow a description of this tribe from a Dominican monk who makes the following statement concerning them:

> There are but few of them in the Cordillera which traverses the eastern portion of the province of Cagayan toward the Pacific, but they are numerous in the mountains of the Central Cordillera. They are much more numerous than the Negritos in this region. The bulk of their large settlements are found in a portion of the Central Cordillera, more than 36 miles long, between the town of Malalagueg and the coast of the China Sea and Pamplona, and Abulug, which is where their settlements end. They live in a valley suitable for cultivation. They are ferocious assassins. The Calinga type is very similar to the Indians, but a little whiter. Some of them are strong and robust, with very regular and delicate features, although they do not equal Europeans.

They live to the north of the Calauas in the Cordillera which runs from southwest to northeast between the Rio Grande de Cagayan and the Abulug or Apayao.

The Buquiles are the Malay Negritos of the island of Mindoro, who inhabit the regions near Bacao, which is a dependency of Calapan, the capital of the island. They are also to be met with along the Subaan River, which empties on the north coast.

The Aripas are a tribe living in the vicinity of Túbang, situated among the rough mountains in the center of the province of Cagayan de Luzon.

The Igorrotes are the Malay Negritos of Mount Iriga, Ambos Camarines. They also occur in the provinces of Abra, Pangasinan, Nueva Viscaya, Zambales, and Pampanga.

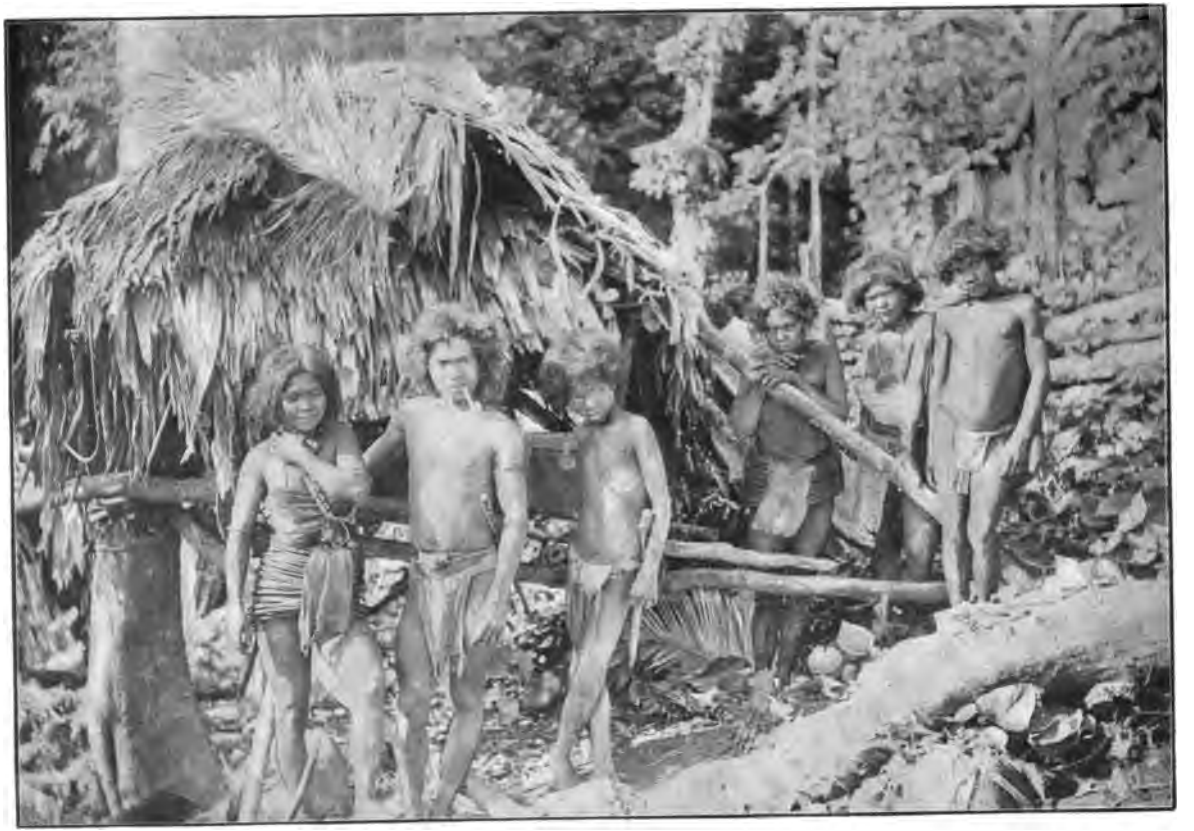
The Tagbanuas are without doubt a Malay-Negrito tribe. They live wandering about the multitudes of little islands between Palawan and the Calamianes. They are also found at Bahile and Bintuan on the Bay of Urugan in the western part of Palawan, as well as in the islands Maitiguid and the islands Linapacan and Dicabaito, to the south of Culion.

The Tandolanos inhabit the island of Palawan. As their name indicates, they live on the capes along the shore of the east coast from Point Diente to Point Tularen. This tribe is derived from the Igorrotes, and is warlike. The Tandolanos poison their darts with a venom so active that it causes immediate death.

The Tinitianos live in Babuyan, to the north of Bahia Honda, in the eastern part of Palawan. There is no available information as to their origin or customs.

The Bulalacaunos inhabit Palawan and the Calamianes group. They are of a dark citron color. The nose is somewhat aquiline. The hair

MANGUIANES WOMEN.



GROUP OF MANGUIANES.

is somewhat crisp, and there is a slight beard. They are of delicate physique. In Masbate and Ticao there are also Bululacaunos similar to those of Palawan.

The Burics.—The people of this tribe live in the province of Abra, in the northern part of the Cordillera, which runs from the center of the province of South Ilocos to the western limit of Nueva Vizcaya, traversing the center of Abra. The Burics are more robust and vigorous than the Igorrotes and have the custom of tattooing coats of mail on their bodies and twining serpents on their arms and legs. They are more pacific and humane than their neighbors, and they display notable industry in the manufacture of certain arms which find a market outside of their country. They also occur in the district of Lepanto, on the western slopes of the Caraballos.

The Busaos are another tribe of the province of Abra. They dwell in the iron-producing mountains of Siguey, near the town of Benang. They tattoo themselves, but only on the arms, where they fashion flowers of various sorts. They often wear in their ears great copper rings, and still more frequently heavy pieces of wood. They cover the crown of the head with a cap of wood or rattan, sometimes adorned with feathers. They are of a peaceable and industrious disposition, and take good care of their little plantations. The following synoptical table gives a résumé of what has been said concerning the Malay-Negrito subrace:

Race.—Malayan with Negrito blood.

Local name.	Habitat.
Attas	The forests of South Camarines.
Irayas	Banks of the river Ilaron, eastern slopes of Sierra Madre, on the side of Nueva Vizcaya, Isabela, and Cagayan.
Itetapaanes	To the east of the Busaos, bounded on the south by the Igorrotes of Benguet and on the north by the Guinaanes.
Gaddanes	From the river Madet to the river Chico of Cagayan. They live to the north of the Ifugoas.
Ilongotes	South Caraballo and Caraballo of Baler, Casiguran in the district of Principe.
Balugas	Eastern Cordillera of Nueva Ecija, Tayabas, and Zambales, eastern mountains of the two Ilocos provinces.
Dumagas	From Baler and Casiguran to the north coast of the Pacific side.
Ibilaos	Neighbors of the Ilongotes.
Manguianes	Mindoro between Abra, Ilog, and Pinamalayan.
Isinayes	Panay.
Guinaanes	Province of Abra.
Allabanes	Panay.
Apayaos	From North Ilocos to the highest part of the Grand Cordillera.
Catatangas	Panay.
Adaugtas	The extreme north of the Cordillera of the Western Caraballos.
Abunlon	Zambales.
Calauas	Malaueg—ravines of the river Chico on the side of Ilaves.
Quianganes	Nueva Vizcaya.
Calingas	To the north of the Calauas, between the Rio Grande of Cagayan and the Abulog or Apayao.
Buquil	Mindoro, in the neighborhood of Bacoo and Subaan.
Aripas	Neighborhood of Tabang.
Igorrotes	Mount Irriga, provinces of South Camarines, Abra, Pangasiinan, Nueva Vizcaya, Zambales, Pamoanga, etc.
Tagbanuas	Islands from Palawan to the Calamianes.
Tandolanos	Western coast of Palawan.
Tinitianos	Eastern part of Palawan.
Bulalacaunos	North of Palawan and Calamianes group.
Burics	Western slope of the Eastern Caraballos, district of Lepanto.
Busaos	Near Benang to the north of the Burics.

SECOND SUBRACE.

THE MALAY-CHINESE.

We term the people of the second subrace Malay-Chinese not because these two types are the only ones which appear in them, but because they predominate and are found in almost all the tribes here placed.

Since the immigration of Chinese has always been limited to men, it will be readily understood that there was bound to be frequent crossing with the natives, and the mestizos resulting from such unions are very numerous. Furthermore, in the crossing of the Chinese with the Indians the Chinese blood is so potent that a small proportion suffices to produce a wide variation from the primitive type of native.

The admixture of Chinese blood, therefore, is much more important than that of Indonesian blood. It must have begun long before the arrival of the Spaniards, and it is still ceaselessly augmented. If this should continue it might eventually result that it would take the place of the Malayan blood.

CHARACTERISTICS OF THE BICOLS AND TAGALOGS.

These two peoples have well nigh the same characteristics. Their original Malayan type is profoundly modified by the influence of various crossing, which probably first took place in remote times and which has continued with more or less frequency up to the present day.

The first of these crossings—and the most important are those which took place in ancient times—must have been with the Negritos, a fact which is still clearly proved in certain individuals by the smallness of their size, by their curling or undulating hair, and by the darker color of their skins.

The crossing with Indonesian tribes has not left well-marked indications. It manifests itself only by the lighter color of the skin in a few individuals.

The Chinese Indian is revealed by his increased height, the elevation of his skull, the obliqueness of his eyes, and the elongation of his extremities.

Finally, the peoples which we are about to discuss have a small amount of Spanish blood. This crossing, although due to a small number of individuals, is not without importance, for it has been going on constantly for three centuries. White blood is detected especially through a type of nose intermediate between two types as distinct as those of the European and Malay.

From what has just been said it will be evident how greatly the type may vary among these peoples. In the two southern provinces of Luzon, for example—Albay and Sorsogón—the fundamental Malay type oscillates perpetually between the four types just mentioned, but with greater frequency toward the Chinese type. All of the characteristics except the form of the skull vary under these diverse influences.

The posterior region of the skull is frequently flattened, as if cut with an ax, and this flattening is so marked that it is observable even

TYPES OF MALAY-SINENSE AND MALAY-NEGRITO.

TH
PU

TINGUIANES OF THE PROVINCE OF ABRA, LUZON.
Types of tribes still in savagery.

MANGUIANES NEAR THEIR HUTS.

in the women when they wear their long and thick hair hanging down their backs.

It may well be asked whether this flattening of the occipital regions is hereditary or is the effect of some artificial procedure.

It is undoubtedly natural. One may enter the houses of the Indians at any time and never find any trace of artificial flattening operation. Furthermore, this flattening is to be noted in Spanish mestizos, whose parents take great care to keep them from usages and practices which might serve to make more conspicuous the characteristics due to native blood.

As for the region inhabited by the peoples we have just described, the Bicols may be found in Sorsogón, Albay, Ambos, Camarines, and a part of Tayabas.

The Tagalogs are gathered about Manila in some of the most highly civilized provinces of the Philippines, to the number of about 1,500,000. Some of them imitate the manners and customs of the Europeans.

THE VISAYANS.

The Visayans also belong to this group. They are spread to the number of 2,500,000 over the group of islands bearing the same name, and since very early times have been establishing themselves on the coast of Mindanao, where they have formed numerous colonies. Don Jose de Lacalle characterizes them as follows:

> One's attention is immediately attracted by the uniformity of the type, which does not present the modifications so noteworthy in the case of the inhabitants of the island of Luzon. This circumstance noted by Jagor in the provinces of Samar and Leyte is readily proved to hold true elsewhere. The measurements of the skull, the structure of the organs, and the general external aspect of these people maintain a very striking resemblance and relationship. That diversity of type which is elsewhere so strongly marked is not to be seen among the Visayans. The color of the skin is reddish yellow, and lighter than that of the Tagalogs. The hair is black, but not so coarse as with the latter people. The eyes, small and animated, are slightly oblique. The beard is inconspicuous and the cheek bones are moderately prominent.
>
> The cephalic index varied in fourteen skulls from 80 to 81.10. They are therefore subbrachycephalic. The parietals are somewhat flattened laterally, and the frontal is almost plain. The zygomatic arches are strongly curved. The forehead lower espina nasal is weakly developed, as is the mentón. The nasal index gave an average figure of approximately 52. The arrangement of the zygomatic arches gives to the face of the Visayans a greater breadth than would correspond to the remaining lateral measurements, which are not so great as those observed in skulls from Luzon. The index of the orbit approximates that which we have seen in the inhabitants of the latter island, and the bimaler diameter is slightly less.
>
> The general organization is well developed, and the superior robustness or vigor of this tribe is undoubted.
>
> In this race the physical and moral predominance of the women is particularly notable. Their form is symmetrical and harmonious throughout.

In general, it may be said that the Visayans are no more highly civilized than the Indians already described, but they are more robust, and some of them, especially those of Bohol, have the reputation of having fought the Moro pirates and defeated them.

OTHER CHARACTERISTICS AND OTHER TRIBES.

We take from the same author certain other data which may be considered common to the tribes of which we shall speak later and to those already mentioned. These people have in general the characteristics of a highly lymphatic temperament. Climatalogical influences

on the one hand and prevailing customs on the other strongly favor its predominance. The hepatic system becomes strongly developed, hence the frequency of inflammation and other gastrohepatic affections. This does not hold for the nervous system, which, in spite of what certain authors have said, gives evidence of normal development in the native. The physiological senses are keen, and sight and smell are exquisitely sensitive.

They agree also, although with less uniformity, in the following external characteristics: The skin, which is slightly rough and coarse, does not have the same color in different individuals. In general it is a dark copper color with various tones and shades, from the dull reddish of certain Polynesians to the light yellowish of the Asiatic people. The color is darker among the inhabitants of the north of Luzon than among the Bicols, who live in the south. The dark color predominates among women, and one notices that it is characteristic of those who are strongest and best formed.

The head is covered with coarse, black hair, which is straight and extremely strong and long. Over the rest of the skin the lack of hair is noteworthy, and it is exceptional to see a man with indications of a beard.

The nose shows very different forms in different individuals. The forehead is large, broad, and flattened, with the frontal elevations but slightly marked. The superciliary arches are more developed than in the Malay race. The eyes are large and black, and they sometimes show a slight obliqueness.

Pampangos, Pangasinans, and Ilocanos.—According to Montano "these individuals owe their height to Indonesian blood, which, it would seem, may be observed among various independent or recently subdued tribes in the center or the northern half of Luzon."

The Cimarrones.—By this name are known the pagans who inhabit the peninsula of Camarines, in the island of Luzon. It would seem that they are not all of the same origin.

The Tinguianes, or Itanegs, are continuous on the north and west with the Búsaos. They live near South Ilocos, in the cordillera of Tila, which is in the district of Lepanto. They are also found throughout the greater part of the province of Abra. Their color is quite light. They are a pacific people.

The Ifugaos inhabit the Cordillera of the eastern Caraballos in the slopes which lie toward Nueva Vizcaya, on the left bank of the Rio Magat, and the missions of Ituy. They are a bloodthirsty lot, and are fond of assaulting travelers in order to rob and kill them. It is their habit to put a rattan ring in the ear for each person that they murder.

The Catalanganes live along the eastern branch of the River Ilagan, in the province of Isabela de Luzon.

The Manguianes inhabit the island of Mindoro to the south of the River Pinamalayan, which empties into the sea upon the eastern coast of the island. They have a black eye, Roman nose, and conspicuous cheek bones. Their forehead is fattened. Their skins are olive colored. They are in the habit of wearing a long tress of hair, hanging down from the back part of the head after the fashion of the Chinese, the rest of their hair being close cut or shaven. They are industrious and less needy than the other wild tribes of the island.

PLATE XIII.

MORO DATO AND SONS.

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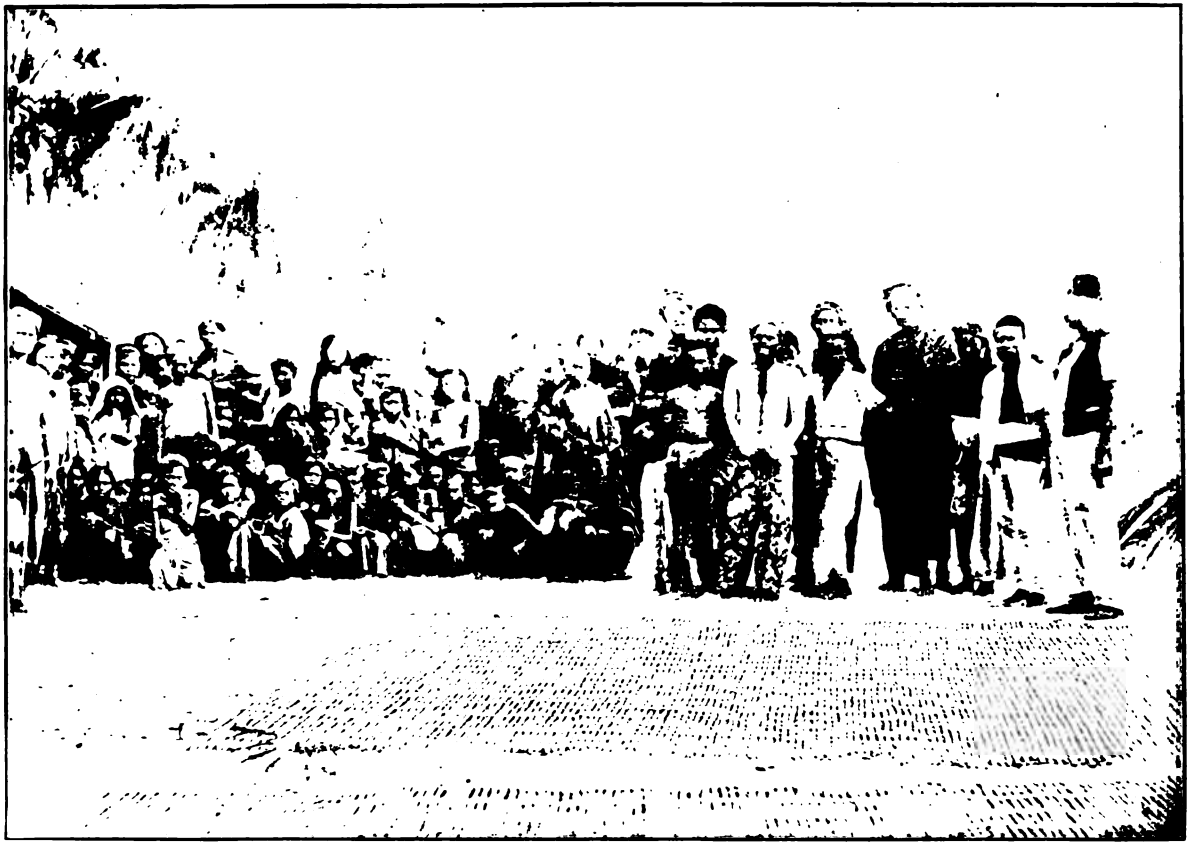
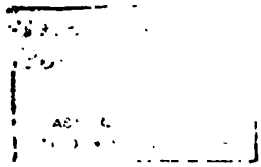


RANCH OF MOROS IN THE ISLAND OF BILAN-BILAN (ZAMBOANGA).



THIRD SUBRACE.

THE MALAY MOHAMMEDANS.

We now come to the third and last subrace, which we consider to be divided into eight tribes, whose distinctive characteristics will be discussed later. We will first consider certain characteristics common to them all.

The Moros are well developed and are of medium height. The skin is of a dark copper color, more pronounced among the inhabitants of the interior. Straight, black, and very abundant hair covers the head and conceals a part of the forehead. Their small, black, and animated eyes show their suspicious character and evil disposition. The cephalic index, according to the data of Don Jose de Lacalle, varies from 81 to 81.60. Their skulls are distinguished by the constant prominence of the frontals, and by their prognathism, which attains to 69°. The nose is broad, but not flattened. The facial angle does not pass 84°, and frequently does not reach this figure. When the Moro conquest was checked by the Spaniards in its movement toward the north, the extreme points which it was agreed they should occupy were the island of Palawan, the third meridian of the island of Mindanao, and, curiously, the west coast of the same island. Until 1860, in which year eighteen steam gunboats reached the archipelago, it was not possible to break their indomitable pride and to establish safe communication throughout the Mindoro Sea. Later on, thanks to various military operations, they were brought within the limits above outlined.

MOROS OF SULU.

The island of Sulu, at the center of the archipelago bearing the same name, has always been the political, religious, and commercial center of all the Moros, and even to-day, in spite of the fact that Spain had occupied the island since 1876, and has imposed her protection upon the Sultan, nevertheless all the other sultans and datos of the region indicated respect him, at least outwardly.

The type of the Malays of Sulu has been modified by two distinct and opposite foreign elements, namely, the native of the Philippine Islands and the Arab.

Until within a few years the Moros in general, and the natives of Sulu in particular, practiced continual piracy along the Philippine coasts, including even those of Luzon. If they had kept for themselves the slaves which they captured, the population of the island of Sulu would to-day be chiefly formed of a mixture of the native Philippine peoples, but the pirates sold a great part of the slaves that they took.

Although they bear a certain amount of relationship to the Indian, nevertheless the Sulu natives are readily distinguished from them by various marks and characteristics. For one thing, they are more robust, although of lower stature than the Bicols. This is doubtless due to the sort of life they lead, which is more full of adventure and activity than is that of the peaceable Bicols. The lower stature of the Sulu natives is due to the fact that they have less Chinese blood in their veins, not because the Chinese do not exist in the Sulus, but because they are much less numerous than in Luzon and find more

difficulty in getting native women to marry them. The Sulu natives are further distinguished from the Indians by their lack of prominent cheek bones and their smaller alveolal and dental prognatism. Their face is less flattened and the nose is more prominent. The sickle-shaped fold is much less pronounced and sometimes lacking. The transverse axis of the eye slit is less oblique with the Moros than with the Indians. The eye opening is almond shape and much rounder than with the Indians and Chinese. The hair is much finer, and its cross section is kidney-shaped and not triangular. The eyebrows are not thick. The color of the skin is frequently lighter than with the Indian and is not so much inclined to be yellow or ashy gray. They file the incisors and canine teeth, sometimes on their front face and sometimes on their lower border.

The Arabic element has modified the Sulu type in a much smaller degree. The natives of that race, being in insignificant numbers, would have left no trace of their presence in the archipelago had it not been that most of them occupied the highest posts, which are the only ones that among them make polygamy possible. Individuals who show Arabic characteristics more or less plainly are not uncommon, and some of them even reproduce the original type with all fidelity. An example is one of the panditas, or Sulu priests, the head of one of the oldest families of the island.

The Sulu Moros occupy the island of Sulu to the number of some 27,000. In Tawitawi there are about 13,500. They also inhabit the multitude of small islands adjacent to those just mentioned.

MOROS OF THE RIO GRANDE, LANAO LAKE, AND ILLANA BAY.

These Moros occupy, in addition to the west coast from Punta Flechas to the Trampadidu River, a great extent of territory around the Lakes Lanao, Liguasan, and the north shore of Lake Balúan. They are noteworthy for their large numbers, which, according to the Jesuit missionaries, attain to a total of 200,000. They show bravery and ferocity in their frequent excursions to rob and enslave the pagans in their vicinity, i. e., the Subanos, Tirurayes, Bilanes, Atás, and Monteses. For this reason they have long enjoyed, like the natives of Sulu, the reputation of being warlike, bold, and rapacious. Nevertheless, Father Pastells[1] insists that—

> On the day when missionaries succeed in planting the cross among these pagans, who are surrounded by Moros, the latter will lack for slaves to cultivate the soil for them, dress them, build their houses for them, and serve them as a means of luxury and commerce, and will find themselves compelled to change the campilan and the kris for the plow, and the arrogant ferocity of the warrior and pirate for the peaceableness of the man who sees himself compelled to gain his bread by the sweat of his brow.

As for their characteristics, it may be said in general of all these Moros that they are of medium or small stature, and for the most part weak-limbed, but their forms are well proportioned up to 15 or 20 years of age. Their nose is small and flattened. The mouth is small and the lips are thin. The color of the skin is dark, with a certain yellowish tone. The cephalic angle is lower than with the Sulu natives, and its height greater than with them, both characteristics

[1] See appendix to Vol. VI of the Letters of the Fathers of the Company of Jesus belonging to the Philippine Mission, p. 346.

PLATE XV.

MORO BOYS.

Living near river Matiao, east coast of Bay of Dávao.

PLATE XVI.

MOROS OF THE INTERIOR (BAY OF DÁVAO).
(Chief family of the new Christian town of Alberique.)

being undoubtedly due to the frequent and long-continued crossing of these Moros with Indonesian tribes. It should be noted well that these characteristics are not fixed throughout the whole region which these Moros occupy, but are general or common. The type varies considerably at different points.

MOROS OF THE GULF OF DAVAO.

The Moros of this tribe dwell in part near Mayo Gulf and in part along the Gulf of Davao, where they occupy a portion of the coast region and the mouths of the rivers. They are not formidable, because they are few in numbers and isolated.

These Moros differ from those of Sulu on account of their Indonesian blood, due to marriage with women bought or stolen from the tribes of the interior. This admixture of Indonesian blood is, according to Montano, the cause for the falling of the cephalic index from 84.67 to 81.94, and for the increase in their height to 1.573 meters in place of 1.526 meters, which is the average height of the Sulu natives. They seem to form a transition between the Malays of the southern Philippines and the Indonesians of Mindanao.

OTHER TRIBES.

The name Sanguiles is applied to those who occupy a strip along the southern coast of Mindanao from Culut to the Gulf of Sarangani, inclusive. Those who inhabit the little island of Olutanga, near the extremity of the small peninsula which separates the gulfs of Sibuguy and Dumanquilas, are called Lutangas. Those who are found in small groups along the shore of the Gulf of Sibuguy are known as Calibuganes. The Samales-Lauts inhabit the coast region of Basilan, while the Yacanes occupy the interior of that island. Those who are to be found on both coasts of southern Palawan are the Sulu-Moros (Joloanos).

The total number of Moros in the Philippine Archipelago is estimated by the Jesuits to be about 350,000.

In the table which follows there will be found summed up the more important facts as to the Malay-Chinese and the Malay-Mohammedans:

Race.	Local name.	Habitat.
Malayan with Chinese blood.	Bicoles	Albay, both Camarines and a part of Tayabas.
	Tagalos	Manila and the center of Luzon.
	Visayas	Visayan Islands and some towns on the coast of Mindanao.
	Pampangas	Pampanga.
	Pangasinanes	Pangasinan.
	Ilocanos	North and south Ilocos.
	Cimarrones	South Camarines, Isarog Mountain.
	Tinguianes	The Cordillera of Tila, district of Lepanto, and in the province of Abra.
	Ifugados	Missions of Ituy and Panigui; eastern Caraballos.
	Catatanganes	Eastern branch of the river Ilagan.
	Manguiyanes	Mindoro to the south of Pinamalayan and in the island of Sibuyan.
Malay-Moros	Moros	The Sulu Archipelago and part of Palawan.
	do	The Rio Grande, Lanao Lake, and Illana Bay.
	do	The vicinity of the gulfs of Mayo and Davao.
	Sánguiles	Coast of southern Mindanao and Sarangani Gulf.
	Lutangas	The little island of Olutanga.
	Calibuganes	The Gulf of Sibugney.
	Samales-Lauts	The coast of Basilan Island.
	Yacanes	Interior of Basilan Island.

PART III.

USAGES AND CUSTOMS OF THE PHILIPPINE PEOPLES.

CUSTOMS OF THE MANDAYAS.

The Mandayas are as a rule docile, hospitable, and inclined to social intercourse. They govern themselves after the fashion of the civilized Indian, having gobernadorcillo, headmen, lieutenants, justices, and bailiffs. He who has most distinguished himself in the settlement on account of his influence is usually the petty king, whom all obey and consult, including the gobernadorcillo and head men. Commonly it is the ambition of relatives to live near each other, and this is the reason that there are preserved among them fixed traditions, of which a legal and penal code form a part. They cherish this code with great care.

They are strongly attached to their idolatrous rites. They believe in two good principles, father and son, and in two evil ones, husband and wife.

The wildest among them sometimes employ human sacrifices, which they carry out with extraordinary cruelty. Sacrifices of animals are common throughout the tribe, and various usages and ceremonies appear in the carrying of them out.

The most important and solemn sacrifice for them is the Balílic. In order to celebrate it they get together ten or twelve dancers or more, according to the degree of splendor which they wish to give to the feast, and having prepared beforehand the little altar of the diuata in front of the house of the man who is paying the costs of the celebration, the owner of it comes out with a big hog and gives it to the dancers before an assemblage of from one to two hundred invited guests. When the hog has been placed on the altar, the richly dressed dancers immediately surround it. Later the Mandayas play on the tambourine the pieces sacred to the diuatas, while the dancers follow the time with their feet, dancing around the altar and singing at the same time the Miminsad; also, trembling from foot to head and inclining themselves from one side to the other, they describe with their revolutions various semicircles. They raise the right hand to the sun or moon, according as it is day or night, entreating according to the desire of the one who has caused that Balílic to be celebrated. Almost immediately the head dancer separates from the others and wounds with her balarao (a sort of little dagger) the hog placed on the altar; and she is the first who participates in the sacrifice. Applying her mouth to the wound she sucks and drinks the blood of the animal, which is still alive, and in imitation of her the others do the same. If the operation causes

nausea to some of them, it is a bad dance. Later they return to their place, repeat the dance, tremble, finally sit down, and talk with Mansilatan, who, they say, has come down from heaven to inspire them with that which they immediately prophesy. It is often the announcement of a good harvest, or the curing of some infirmity, or some triumph over enemies, so the Balílic is concluded. The hog is dressed, a part of it is offered to the idol, and the function is concluded with a general drunk.

They make numerous and frequent sacrifices, after the fashion of the one just described.

They have many superstitions, some of which are very curious. To enumerate them all would be a long undertaking. When there is an eclipse, they believe that a snake is eating the sun or the moon, and in order to frighten it so that there may not be perpetual darkness they shout, raising a tremendous outcry, and strike blows upon various objects. They follow the same procedure when there is an earthquake, in order to pacify the immense crocodile which causes it by moving about in the center of the earth.

They inter their dead in the forests in the cavities of the cliffs, together with their arms and shields and a pot of boiled rice, in order that they may have food and weapons to defend themselves during their journey.

Among the settlements whose inhabitants are most superstitious in front of each house is found an idol, with an altar full of offerings. As a rule all of them place inside of their houses, at a suitable height and under a red canopy, a small idol, surrounded by fruit of the betal palm. Hanging from its neck is a small sackful of rice. Every evening while dinner is being prepared it is their habit to play upon certain instruments, and while dancing about the room to sing the following words: "Situated between the good and the ill, we entreat the Liberator to descend from heaven to-day for our good."

During the watches of the night the parents give to their children various curious bits of advice concerning the hechicara (witch), the giant, and the dwarf, and the old women tell their stories.

The men wear a sort of loose trousers, and a short jacket opened down the front of the breast. The women wear the jábol for a skirt, and a short waist or jacket like the men. Both ornament themselves with necklaces, bracelets, anklets, bells, teeth of deer and crocodiles, little bundles of fragrant herbs, and other objects, according to the splendor with which they wish to shine. They are sometimes seen with a golden collar and slippers of silver, made and worked by themselves. They are very much addicted to the habit of chewing betel nut and tobacco. The latter they mix with "among," from a creeper which they call balinguina, and the former with caningag, a poor sort of cinnamon which is very abundant in that country.

The Mandayas do not employ money, but exchange and barter different objects, and if they receive silver it is in order that they may manufacture the above-mentioned articles of luxury, with which they adorn themselves, and to embellish their arms.

They believe it is an obligation, even with the death of the one who has inflicted them. From this it results that feuds are sometimes handed down for several generations.

The Baganis, so called, are distinguished by their dress, which varies according to the number of persons whom they have assassinated.

Those who have committed from five to ten murders wear on the head a flesh-colored handkerchief. If the number lies between ten and twenty they wear a scarlet handkerchief and shirt; while those who have killed twenty or more have scarlet pantaloons as well. After committing a murder they cut off a lock of the hair of the victim in order to ornament the border of their shields, and in this way they keep track of the number of persons whom they have killed. They use armor made of three thicknesses of split rattan in order to protect the breast and back. When pursued they make the progress of their enemies difficult by driving into the ground sharply pointed pieces of bamboo of different lengths, and set spring bows, which are carefully concealed.

They build their houses in strategic and almost inaccessible positions on the summits of the crags and in the tops of trees. They usually attack at dawn, but they first assure themselves of the probability or certainty that their undertaking will result well. They prepare ambushes in dense thickets along paths, and when they can not satisfy their vengeance on the enemy who is the target for their wrath, they take it by shedding the blood of his close or nearest relative or that of his friends or of members of his settlement.

Among the Baganis there are found some cannibals who are said to tear out the palpitating entrails of the victim and eat them, together with pork and chicken meat and sweet potatoes, or only with boiled rice.

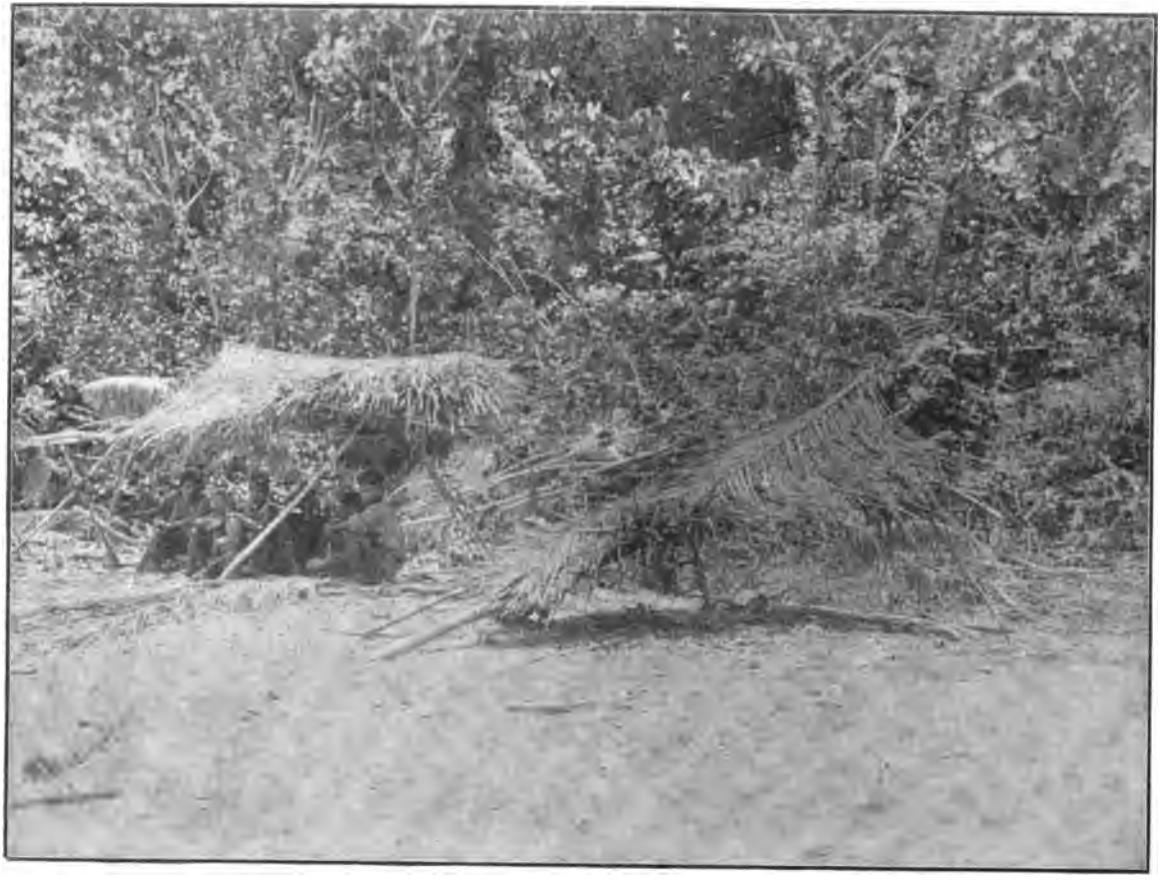
A husband is under obligations to pay for his wife in advance by serving for her parents for a period of four to six years. This is the origin of the custom of having the young men live in the houses of the parents of the women whom they are to marry. If the man is of some importance, he pays for a wife as high as six slaves. In addition, the aspirant gives, from time to time, hogs, tuba, rice, plates, bolos, and lances to the parents of the lady of his choice. A man who breaks an engagement loses by this act all that he has given. A woman under similar circumstances must return what her parents have received and must, furthermore, give a slave in exchange for herself. Marriage among the Mandayas is solemnized by the husband giving the wife a handful of boiled rice, and vice versa, in token of the fact that they are to mutually sustain each other.

THE MANOBOS.

The Manobos constitute one of the most numerous tribes of the island of Mindanao. They are, in general, fierce, inconstant, and distrustful. They ordinarily build their houses in the tops of trees near rivers. Although they do not lead a nomadic life, like the Mamanuas, nevertheless they ordinarily change the site of their huts each year in order to form new cultivated plots, and they do not have the attraction resulting from fixed property rights. There are "Baganis" among them also, and the same strifes and rivalries occur as among the Mandayas.

When someone dies within a house they abandon it, and if the deceased is a stranger they compel his family to pay the value of the deserted house. They ordinarily live in settlements, the chiefs of which maintain a sort of patriarchal or family type of government.

In their rites and superstitions they very greatly resemble the Man-



IMPROVISED HUT.

THE
PUBL
ASTOR
TILDEN

dayas. They believe in three principal divinities, which they imagine as strong animals inhabiting the forests, of which they are held to be the owners. One is called Tamá, who they believe watches over the snares and traps which they set in the forest in order to secure deer and hogs. The sacrifice which they offer in order to make them propitious consists in placing upon a post a couple of eggs or a little rice which any animal may eat, while they in their simplicity believe that the imaginary being has taken it to himself.

Tumanghob they consider the god of crops, and they offer him, upon a lattice work made of sticks and raised a meter or so above the earth, a hog boiled in water and cut to pieces, and at its side the indispensable rice and a little tuba. Then they call him with a great outcry, and as no one appears they decide that the god is satisfied with the mere invitation, and so they themselves eat the offering, terminating the feast by all getting drunk.

Finally, the god called Busao is regarded as the cause of sicknesses, and to him they also offer sacrifices.

The Manobos also resemble the Mandayas in the matter of clothing, arms, and ornaments, with the exception of strings of beads. The Manobos prefer black beads, which the Mandayas despise, always preferring bright-colored beads, provided they are not green or yellow.

THE BAGOBOS.

The Bagobos inhabit the foothills of the volcano Apo, and are divided between as many settlements as there are rivers bathing those dense forests, and the rivers are many. They are of medium stature. It is very unusual to find a Bagobo who is lame, squint-eyed, one-handed, or deformed, for when a child is born with some conspicuous physical defect it is not allowed to live. The Bagobos are industrious, and although they like to keep slaves, it is ordinarily in order that they may sacrifice them. In their wars they make use of the lance, campilan, bow and arrows, and some of them have firearms. As a rule they kill by treachery. The headman, or dato, is wont to attend to the government of his settlement. They settle their difficulties in conformity with the traditions handed down by their ancestors and with their own superstitious beliefs, often availing themselves of the right of might. They do not make idols. They believe that they have two souls, of which one goes to heaven and the other to hell. They worship and offer sacrifices to the devil in order that he may allow them to live, for they say that death, sickness, and other disagreeable incidents of life are due to him. Among other superstitions they believe that one can not ascend the volcano Apo without first making a human sacrifice to Mandarangan, who, according to them, has his throne there and needs human blood to drink. Mandarangan has wives, and is the head devil, and the volcano belongs to him as the gateway or path to hell. During their sacrifices they pronounce the following words: "Eat, Mandarangan, and drink the blood of this man."

The singing of the Limocon (a species of wood pigeon) is for them the voice of God, advising them of the dangers which await them. When the bird sings on the right the augury is good, and they continue their journey without fear; but if it sings on the left they do not dare

to go forward. Various others of the pagan tribes have this same superstition.

THE SÁMALES.

The Sámales, or natives of the island of Sámal, situated in the Gulf of Davao toward the north, and in front of the town of the same name, are found divided into seven groups or settlements. In each of these there is a capitan, or old man, whom they all obey. Their ordinary occupation is the making of small and very rude boats from the trunks of trees split lengthwise and excavated. They also make salt by the evaporation of sea water. They gather beche de mer and sweet potatoes in abundance, and with this they ordinarily nourish themselves. Rice can hardly be raised in their ground, which is usually very dry and lacks rain. As for religion, they show little indication of it, merely practicing certain superstitious ceremonies which they have seen in use among the Moros.

In a little coral island near the coast they have a burying place in a small grotto. The mortuary caskets, made of two excavated halves of a tree trunk, are placed on supports of palma brava, and remain there until time destroys them. Each year, after the conclusion of the harvest, the Sámales go to visit this burying place, leaving there offerings from their crops.

CHAPTER III.

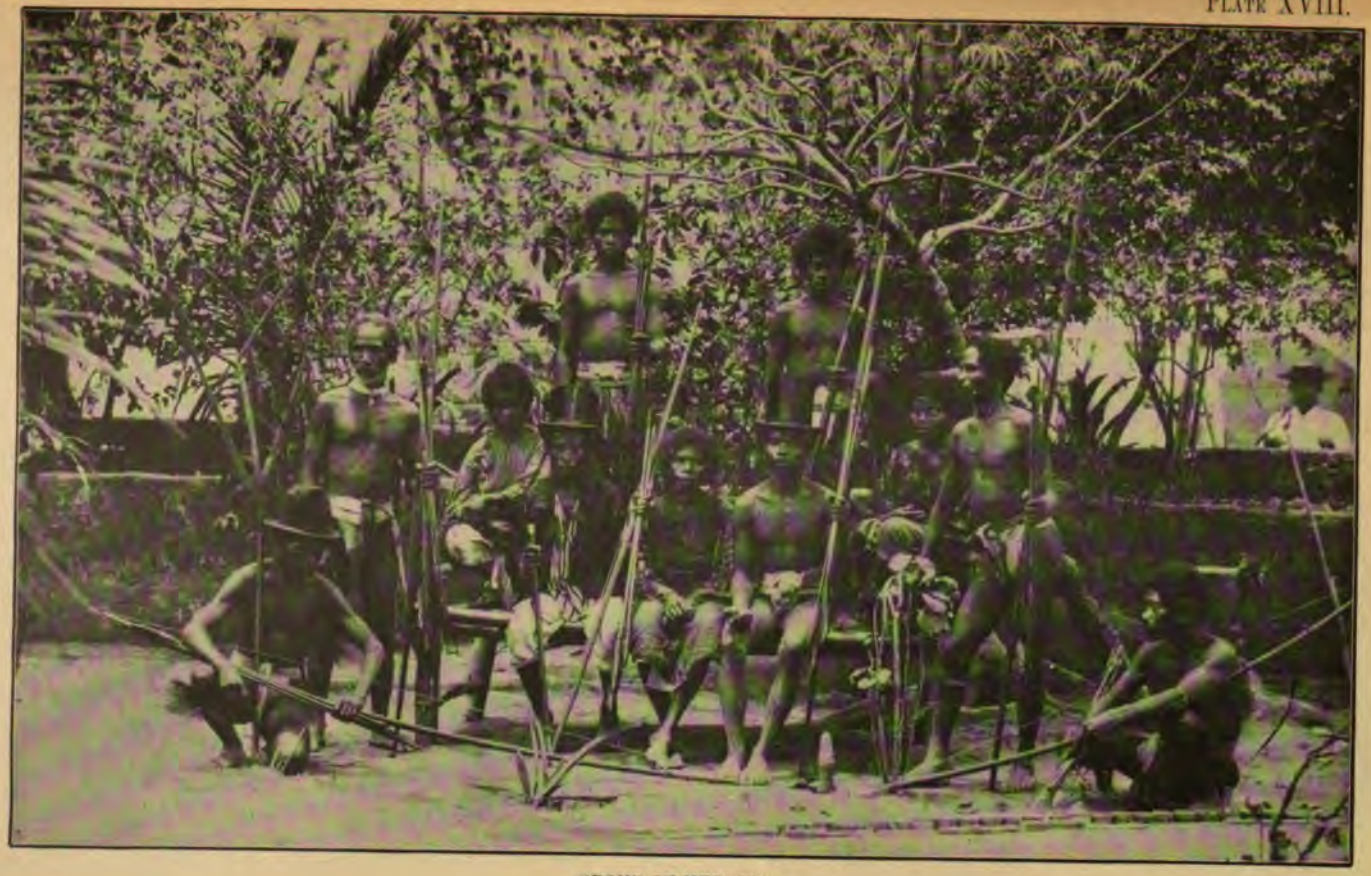
CHARACTER AND CUSTOMS OF THE MOROS.

OBSERVATIONS.

Beyond doubt, even if the Moros did not demand attention on account of their turbulent character and the influence which they have exercised over the population of these islands, they would still be interesting on account of the tenacity with which they hold to their beliefs and their adventurous life, as well as because of the place which their conquests occupied in the history of the Philippines. We therefore give a chapter to the description of the character which distinguishes them and the manner of life which they lead at present at the different places which they inhabit in the southern portions of the archipelago. We shall not discuss in detail all of the tribes usually distinguished,[1] but we shall confine ourselves to the more important groups, making use of the description of the Jesuit Father Murgadas.

The political régime of the Moros of Sulu.—To begin with their government, the Sultan is the sovereign, and is the absolute arbiter of persons and events in the whole region subject to his mandates; that is to say, the three groups of islands which constitute the Sulu Archipelago. As a matter of fact, he does not enjoy so absolute a power, except in those districts which form his private domain, and in the

[1] See the Ethnological table at the end of Part II, Chapter IV.



GROUP OF NEGRITOS.
The chief ones of a large ranch.

PLATE XIX.

ALTAR USED BY THE BAGOBOS AND OTHER PAGAN MOUNTAIN TRIBES.

(They believe that they see and meet spirits in the forms of the large rivers and trees.)

BAGOBOS OF THE SLOPES OF THE APO.
In holiday attire.

BAGOBO ASSASSIN.

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BAGOBO ALTAR OR PLACE OF WORSHIP.
At the source of the river Ragubbrug, near Apo.

districts of those datos who are his relatives or allies. The other districts are governed almost independently by their hereditary datos, whose power is absolutely unlimited. As a matter of fact, the authority of the Sultan is quite weak.

The datos, or feudal lords, are the actual sovereigns in their citadels, and they have subject to their orders chiefs of lower rank, from among whom they select the "tao marahay" (good and brave men) or free men. All the others are sacopes (vassals) or slaves.

Character and general manner of life.—As for their warlike and hostile spirit, each Moro is a soldier and is always armed with kris, campilan, or lance, and sometimes with two of these arms. He never leaves them, not even when at rest, but even sleeps with them; and this Moro soldier is astute and fanatical for his beliefs, obstinate, cowardly in the open field, or when he sees calm and decision on the part of his enemy and can readily escape; but brave, dashing, and audacious to the point of ferocity when he sees himself surrounded and unable to escape; conspicuous for his sobriety, he nourishes himself with a handful of rice, with the fruits which he gathers in the forests, the herbs of the plain, and the little fish of the streams. He drinks the water of springs, more or less clean and clear, and in lack of other water which is better, when he is afloat satisfies his thirst with sea water. Extremely agile, he quickly ascends the mountains, climbs the highest trees, crosses the deepest and thickest mangrove swamps, fords the torrents, leaps across the small streams, and lets himself drop with the utmost coolness from a height of 15 or 20 feet. Accustomed from birth to live in the water, he swims like a fish, so that the crossing of a river, although it be wide and swift, is for him the most simple and natural thing in the world; and when, on account of the strength of the current, he can not or will not swim, a single bamboo, stretched from one bank to the other, makes him a sufficiently commodious bridge.

Owing in part at least to the warlike spirit which animates them, the Sulu Moros have always been turbulent and refractory toward outside domination. They have displayed a tendency toward robbery and piracy. Their settlements, which are always small, are situated in low plains near the fields, or in the vicinity of rivers, creeks, and swamps. They suddenly attack unarmed vessels and the defenseless towns of the Christian natives. They ravage the fields, burn houses, and take captives in order to increase the number of their slaves. To-day, however, instances of piracy are rare. The increasing number of war and mercantile vessels is rapidly putting a stop to it.

Their ignorance is as great as their cruelty. Apart from their datos, and those who constitute among them a sort of ecclesiastical hierarchy, few of them know how to read, and almost no one can write. They have no books except an occasional copy of the Koran, and the Manlut, which are always in manuscript, with vignettes and ornaments not lacking in elegance.

The common people of the towns are as a rule very lazy. A considerable number engage in commerce. They come and go between various points of the archipelago in their light vintas (canoes), some of them trafficking in pearls and pearl oyster shells, others in the highly valued edible birds' nests. They also bring cinnamon, avaca (Manila hemp), hides of bullocks, and buffaloes, shark fins, and other articles.

As for their domestic habits polygamy is common among them, and

the number of women each man keeps depends only on his individual resources. Only one of them, however, is his legitimate wife. The marriage ceremony, which is preceded by a simulated carrying off of the bride, is celebrated before the pandita. Divorce may be had on demand of either party to the contract.

Those who are condemned to death have their heads cut off, or serve the datos as targets for their revolvers, or as objects for trying the edges of their krises or tombicus. Sometimes they are given over to the populace, who cut them to bits with kris blows struck in tune to a certain dance, during which each individual strikes the victim. These executions have in the past afforded occasions for great festivity and rejoicing to the sanguinary population of Maibún.

Costume.—Their costume is similar to that of the Malays. It consists in pantaloons, which are loose, except in the part below the knee, which fits the leg closely, and a small jacket almost invariably of black color. It is closely fitting and has tight sleeves. Both articles of dress are so fashioned as not to interfere with the movements of the wearer. On the head they wear a kerchief rolled into a turban, and some individuals wear shoes on solemn occasions. The chiefs and important officials dress in silk embroidered with gold or silver, and often add a sort of mantle with broad sleeves slit open at the end. Some of them have this mantle stuffed with a quantity of cotton, so that it serves them as a coat of mail. The distinguishing features of the costume of the women are the patadion, a simple red skirt fastened at the waist and reaching to the feet, and a mantle in which they can envelop the whole body. Frequently they wear only the former or the latter in addition to the short camisa, which reaches to the waist.

Beliefs, practices, superstitions, religious hierarchy.—Their religious beliefs are very confused, and they greatly neglect their religion, failing to observe the precepts of the Koran in religious, civil, and criminal matters. It is rare to amputate a hand as a punishment for robbery, nor do they cut out the tongue as a punishment for blasphemy. On the other hand they inflict the death penalty for all sorts of faults, except for fornication, which nevertheless is absolutely prohibited.

For the rest their superstitions are ridiculous. A cloud which crowns some hill, for example, is the sign of the death of a dato. He who can seize a snake changing its skin can make himself invisible as well, and they have many other similar ideas. They abstain, or rather pretend to abstain, from eating pork on account of peculiar scruples. It is their custom to carry food to the graves, which are numerous in the vicinity of their towns. It is customary among them to take oaths to kill Christians, and they hold firmly to the belief that the reward for this is a prompt trip to Paradise on the back of a white horse. Their religious hierarchy is composed of various priests, called in order of their importance sarips, tatips, and imames. In order to be a sarip one must know how to read and write, and as a rule must have made a pilgrimage to Mecca. Those who make this pilgrimage, and who have the other necessary qualifications, thereby attain to the office. There are other grades of lower order.

Their defensive arms are a circular or elliptical shield for the body, or big enough to cover the whole person. The shield is either made of wood alone or is covered on the outside with buffalo hide. From this same hide, which when well cured is extremely hard, they make breastplates and helmets. They have also some coats of mail, although

A MORO OF JOLO.

not many. Their arms of offense are either firearms or steel weapons. Among the former are cannons, of which they possess a great variety from caliber .24 to caliber .1. They neglect them greatly, as they do their rifles and shogtuns, except for one cannon, which in each fort occupies a chosen position and which they regard as the principal one, trusting in it superstitiously for defense and victory. Culverins of great length have been taken from them occasionally, and other small pieces which will only admit balls from caliber .2 to caliber .1; they are called lantacos and are in common use. The Moros make powder and some shot.

They manage their pieces very slowly and often load them to the muzzle, making use of stones, nails, or pieces of iron in default of other projectiles. They also employ bits of a shell called taclobo or tacloe, which is extremely hard.

As for guncarriages, they have some very good ones, which are evidently of English construction. Others are heavy and badly made, evidently by the Moros themselves, some with wheels, others without. In order to move them they make use of a contrivance very similar to that which is employed on war vessels, by means of pulleys and cords.

Their artillery tactics amount to holding their fire until the enemy is very near. In this way it is very easy to take aim and no shots are wasted.

In their land expeditions they usually do not carry artillery, although they have sometimes employed small pieces, mounting them on forked sticks supported on little benches with three feet.

Some people have wondered that they have had, and still have, artillery in abundance, but in addition to the fact that it is obtained easily in Borneo, when they need it, and at other points, and that they took possession of all they used to find in the numerous vessels which they captured, when, stronger than to-day, they practiced piracy. It is certain that upon the arrival of the Spaniards in these islands, the Indians cast cannon in Manila and Tondo, and also probably in Mindanao. Their steel weapons are the lance, the kris, the campilan, a three-pointed harpoon, and knives. Their temper is usually good, and one sometimes sees kris blades beautifully inlaid and so finely polished that they are in no way inferior to the famous blades of Damascus. The handles are, as a rule, made from hard wood obtained from a certain root. Many are of ivory and some, for the use of sultans and magnates, are of solid gold. They do not poison the points of their lances and javelins, as do the savages of the north and some of the pagans who dwell in the mountains; nor do they at the present time use arrows, which, however, they formerly employed.

They are very dexterous in the use of these steel weapons, and the principal merit of their tactics lies in the agility with which they are endowed, which gives to their rapid movements a certain freedom and activity.

The Moro who is disposed to fight, covered by his shield, and keeping the campilan, kris, or knife extended in his right hand, crouches, leaps up suddenly, turns, leaps from side to side, with the quickness of thought, laughing at the strokes of his opponent. It seems that he flees, when he suddenly rushes furiously upon his enemy, and hardly has he delivered his blow when he is seen ten paces away, leaping and whirling again, all of this accompanied by sharp cries and horrible grimaces, which serve, according to them, to confuse and alarm the

adversary. If the arm which they use is the campilan, which has on the pommel a plume of horsehair or agave of thread stained red, they whirl it rapidly in different directions before the eyes of the opponent to make him dizzy.

When the arm is a lance they handle it with a special knack, as they do the harpoons and javelins, which they use especially when from the top of walls they defend themselves against an assault.

They never employ cavalry, which is not to be wondered at when one takes into account the nature of the country, which is quite unsuited to the operations of such a course.

Fleet.—Their fleet, which plays an important part in their campaigns, includes a considerable number of kinds of craft, which cruise together. They are poncos, selisipanes, vintas, pilanes, and lancanes.

All of these craft, not only on account of their form, but also on account of the large number of paddles, agree in being very fast, and since, thanks to their simple construction, they can be readily taken apart and put together again, it is easy to draw them up and hide them in the forest or mangrove swamps, taking them to pieces if they are too large. On account of their small draft they go everywhere, especially the vintas, for which a foot and a half of water suffices. Thus it is that they go up the small streams and brooks.

The Moros are good sailors, and since they are at the same time excellent swimmers, when wind or sea upsets one of their boats the crew take to the water and readily right it again.

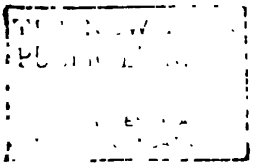
MOROS OF THE RIO GRANDE AND LAKE LANAO.

These Moros are extremely proud, jealous, and distrustful; ready to make vague promises, but unwilling to make definite ones which might demand fulfillment. They show a certain malice in their relations with the Spaniards which one can understand only with time. Very lazy, they avoid work as far as possible, and spend much of their time in repose, to which their physical debility and the enervating climatological conditions contribute not a little. It would, nevertheless, be possible to get some of them to cultivate the soil, as is true by some settlements near Cotabato. Slow in all their agreements, one of their particular pleasures is dechira, or conversation, which is prolonged hour after hour on the idlest pretext.

The costumes which the individuals of both sexes wear are almost identical with those employed by the Ilocanos. The men coil a handkerchief about the head, leaving the crown uncovered, and with the point of the handkerchief projecting at one side. They wear a short jacket of white cloth, or of dull colors, which hardly reaches the waist. The patadion, so common in the Indian and Malayan settlements, covers the leg only to the knee, and not to the ankle, as among the Singalese of Ceylon. The sash is quite common, and the magnates wear slippers. The pantaloons are, as a rule, narrower and shorter than those used by other Moros. The women wear patadion, and sometimes jabol and short camisa.

Their principal arms, to which they are singularly attached, are the campilan, a broad saber with a long blade, very sharp, and with its hilt similar to that of the Indian yatagan, with a plume of hair. The kris, a short machete, with a very narrow, straight or wavy blade, with hilt of ivory, or bone and wood (camuning), usually carved with

MOROS OF JOLO.



taste; the dagger, also straight or wavy; the bolo, shorter than the kris, and always straight, and with a long and narrow hilt, which is the arm most used, and which serve them also for the pacific labors of the field.

The lance, with shaft of wood or bamboo, and a long and broad head which may be straight or wavy; and, finally, arrows made of cabonegro, which they are in the habit of poisoning. Firearms, although little used among these Moros, are held in high esteem by them, and their lantacas (a species of culverin) are the greatest treasure of the datos and sultans. The tribes near the lake of Lanao, stronger and more warlike than those of the Rio Grande, use breastplates and helmets. They are quite heavy, and are made of buffalo hide and bronze, or of copper. They have clasps at the center, and their form reminds one somewhat of that of the ones used by the Romans. The most common defensive weapon is the buckler or shield, which also serves them for a hat.

There is a patriarchal form of government established among them. The authority of the head of the family is supreme, and the dato considers his vassals as members of his family. The slaves, which constitute the third class, are not ordinarily badly treated, and frequently become vassals. Both sexes may reign, the princess of Sibuguy, who governed in the gulf of the same name, and held court on its eastern coast, having been one of the most powerful magnates of southern Mindanao. Modern inventions cause wonder and fear among these Moros. They call gunboats ships of fire. Nevertheless, favored by the nature of the country, especially in the swamps, there have been occasions when they gave the Spanish soldiers plenty to do.

In every settlement it is customary to have a priest, or pandita, who wears a white suit and turban. As a rule he has made a pilgrimage to Mecca, and it is his duty to read the Koran, the copies of which are guarded with the greatest care, some of them being very correct—veritable bibliographical treasures which date from the sixteenth and seventeenth centuries. The pandita is called in council in all very important affairs, and he wields the campillan in the campaign.

Some of the principal Moros show a very cultivated intelligence; others display eagerness to learn and great curiosity in regard to the affairs of Europe, which seems to be common to many Asiatic peoples.

The Moro settlements of the Rio Grande live in perpetual discord, which is not, however, very bloody.

SAMALES-LAUT.

The Samales-Laut are a tribe of Moros who form the most numerous and most characteristic portion of the population of Basilan. They occupy the whole coast region, plying their trade of pirates and making captive not only the Christians of the islands if they can, but also the Moros of the interior, called Yacanes, for whom they have a natural antipathy. There are also found among them Sulu and Malayan Moros, forming a total population of 10,000 to 12,000.

Customs and religious observances.—They are by nature dirty, proud, inconstant, very parsimonious in giving, and disposed to talk and fritter away time.

In the wars which they frequently wage against the Christian towns they are fierce and daring, and although dripping with blood fight to

the death, inspired by hatred. They construct forts which they defend with ditches and thick walls of earth.

They ordinarily dress in pantaloons, which are narrow below and loose above, and this is true of women as well as men. The former also cover themselves from head to foot with a mantle, which they pass under the arms, forming folds. The Yacanes wear straight pantaloons.

As for their religion, they pay very little attention to its ceremonies. They suppress many of the precepts of Mohammed and add others which he did not prescribe. They do not pray once a day. They almost never observe Friday, and they no longer make pilgrimages to Mecca.

As for their marriages, the fathers or owners of the young girls rather sell them than turn them over as wives, only granting them to those who wish them on the payment of certain sums, greater or smaller, according to whether the family is more or less important and the girl more or less good looking. In general they demand $30 to $50 or more, besides the cost of the banquet.

The ceremonies with which they celebrate the marriage are extremely remarkable and original. The bridegroom chews the regulation betel nut, comes forth in the midst of the invited guests, and passes his hands over his face, with which gesture they say that he asks pardon of God, confessing his sin. This they call magtanbat. Later, if the bridegroom has not paid for a good banquet, on account of being poor, some of the headmen present give him blows on the back with a rattan more or less numerous according to what he has failed to provide for the banquet. The bridegroom then goes and washes his feet and clothes himself in white. Returning, he heats simself on a sleeping mat and places his right hand within the two hands of one of the headmen and his left on top of the right hand of the remaining headman. Later the imam covers his right hand and the right hand of the bridegroom with a white handkerchief, and thus together they pronounce certain words of the Koran. The imam raises his hands and stretches them out in such a way that the palms are turned toward each other and a short distance apart, and he raises them to his head. The bridegroom does the same, but the palms of his hands are turned toward his face. They then clasp hands in the way already described with the headmen, and immediately a feast follows. When this is over they go to the house of the bride, and there they repeat with her the same ceremony which they have practiced with the bridegroom. At intervals they play on the calintangan, and if it is an important person there are gun shots, while they kill a buffalo or a heifer and invite a large number of guests. The richer the man the more guests are invited. They often have at intervals a warlike dance.

At their burials they dress the dead in a white cloth which covers them from head to foot. Those who aid or visit the deceased are invited to a banquet. The trench which they dig is more or less deep, according to the rank of the person whom they are to bury, but it is always a yard and a half to 2 yards and of lunar form. At one side of it they dig out a sort of cave for the reception of the body. They place upright sticks in this cave where the body is deposited and fill up the trench, while two people keep off the flies with a white handkerchief in order that they may not come near. At the head and the foot of the grave they put a cup of water and food. The imam comes, pronounces some Mohammedan phrases, draws near the trayful which

PLATE XXV.

MORO OF JOLO WITH BOLO AND CREESE.

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MORO DATOS (OR CHIEFS) OF THE RIVER GRANDE OF MINDANAO.
Vestments of silk embroidered with silver and gold.

MORO DATO (CHIEF).

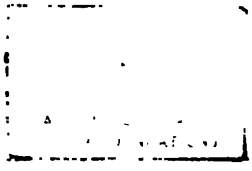

PLATE XXVIII.

DATO PEDRO CUEVAS, WIFE, DAUGHTER, AND SERVANT.
He is a Tagalo, but wears Moro attire. The wife and servant are Moros.

they have provided for him, and there over the grave eats the delicacies on it and retires. When this is over, the death guards come (tunguquibul), who watch over the dead man for some days and nights, according to the means of the family of the deceased. They are paid with food and cloth each time that they are on guard. When the deceased persons or their relatives have nothing left with which to satisfy them, the guard is no longer maintained.

When they get together for public worship, which they do when it pleases them, they call the people together with harsh strokes of a heavy wooden beater upon a sort of drum. The imam in melancholy tones begins an invocation to his god, and reads a passage from the Koran; and in the meanwhile his hearers chew betel nut, talk to each other, lie down, laugh, shout, and go away again, without either the imam or the people's having understood what he has read. The principal and well-nigh the only feast which they celebrate is the maulut, or birth of Mohammed. Each settlement, and sometimes even each family, celebrates it on the day that pleases them. They ought to celebrate it on the tenth night of the month called Rabíe aual, which corresponds to the month of September. It is their custom to celebrate it, however, after the harvest. When asked on one occasion why they did not celebrate it at the proper time, they replied that they celebrated it when they had enough for a good dinner. The various headmen are wont to gather with the imam and sing in a mournful voice, which seems to come forth from a cavern, the women preparing the food meanwhile.

They are very superstitious. They fear Seitan (the devil) greatly, and appease him. During the cholera epidemic of 1882 the Moros of Panigayan, of whom the half died, turned loose boats filled with food upon the sea, in order that when he encountered them the devil would be content with the food. They also hung food upon the trees for the same reason. On that occasion the cherif did a good business, for he sold clear water which cured. In order to obtain the cure they had to recite certain Moorish phrases. If they got well it was on account of the water.

As for education, it may be said that they have none. They know nothing of Mohammed, nor can they tell the day on which he was born, nor anything of his history. The most learned man among them is the serip, whose erudition, nevertheless, amounts only to the ability to write a few words in Arabic.

CHAPTER IV.

OBSERVATIONS.

Having now discussed the Philippine natives who are still to be found in a state of barbarism, it remains to describe the customs which distinguish those who are now civilized and Christianized.

A thorough understanding of this latter class is incomparably more interesting and important, not only on account of the greater perfection of the individuals composing it, due to the cultivation and development of natural faculties and inclinations, but also because it includes the greater part of the population and occupies the most productive

regions of the archipelago, while the civilized natives are in perpetual communication with foreigners on account of commerce and other social relations.

The civilized natives are usually known collectively as Indios Filipinos, although there are distinct tribes among them showing slight differences in dress and customs, according to the provinces which they inhabit and the dialects which they speak. Examples of these tribes are the Pampangos, Pangasinans and Tagalogs of central Luzon, the Bicols in the southern part of that island, and the Ilocanos in Gagayan of its northern portion. To these should be added the Visayans.

We shall now describe the moral make-up of all these peoples, unifying their characteristics as far as practicable.[1]

CHARACTER OF THE INDIANS.

It is commonly affirmed that the lymphatic temperament predominates among them, but the physical characteristics which we have just described sufficiently indicate the fact that the lympathic temperament predominates among the civilized natives, but the irritability of his organism and the moderate development of the muscular system proves that the nervous temperament is also quite well marked. The tropical climate, the exuberant vegetation, and the imposing manifestations of the phenomena of nature in these regions constitute a conjunction of causes sufficient to produce a relative enervation in the cerebral mass, which affords an explanation of a number of physiological phenomena observable in the native. From this cause comes the inconsistency and volubility of his character that is naturally indolent and apathetic.

They are easily affected, although not deeply, but they are so moderate in their manifestations of pain and pleasure, of fear, hunger, etc. (especially in the presence of foreigners), as to give reason for those who do not know them well to think that they lack sentiment. And although it is true that they are resigned and long suffering, yet they feel with as much keenness as the European the pleasurable or painful sensations which they experience. Since they hardly give any sign when under the influence of passion, although it be violent, the most observing person is generally deceived, believing that there is a calm when the tempest is in reality raging. It is not that they dissimilate deliberately, but rather that the idiosyncracy of their character causes them to repress themselves the more the nearer and more vehement the explosion of the passion which dominates them.

In this connection it is worth while to note the terrible or transient influence which the passions exercise over them, particularly anger and fear, which deprive them of intelligence, disturbing radically their judgment and their reason. Thus we see with too great frequency, and with no less astonishment, that the Indian of good character and customs, between night and morning, commits some atrocity entirely out of keeping with his character, apparently with all the cold blood in the world, but in reality without thinking of the consequences. And although one ventures to bring them to his attention he neither notices what is said to him nor thinks of it; but later, when the fury

[1] The material of this chapter is taken chiefly from the work entitled Memoria complementaria de la seccion 2d programa, pobladores aborigenes, razas existentes y sus variedades, religion usas y costumbres de los habitantes de Filipinas. Edicion official, Manila, 1887.

GROUP OF MORO YÁCANES OF BASILAN.

Playing on the culitangan, a musical instrument peculiar to the Moros.

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PLATE XXX.

A SAILBOAT OF THE MOROS.

of passion, which absorbs all his faculties and converts him into a veritable lunatic, is passed, he recognizes his difficult position, laments the crime which he thoughtlessly committed, and accepts whatever penalty may be inflicted.

In the case of his unimportant thoughts he feels disturbed if he is left without his deserts, perhaps because he thinks that he is despised and not made of sufficient importance, and his apprehension in this case reaches such a stage that when he is left unpunished, as if disappointed and claiming punishment, he throws himself, if one may say so, into more serious faults, becoming unashamed before and contemptuous of one who does not punish him, and on the other hand showing himself submissive and sympathetic, serviceable and even friendly to one who chastises him paternally, yet avoids rigor and cruelty. For this, as does ignoring him, far from correcting him, exasperates him, irritates him, and makes him revengeful, just as when one punishes him unjustly.

Fear and other dominating passions of the natives affects them to such an extent as to completely disconcert them, and, as they say, atarantar (tarantula bite) them, but without changing them outwardly, and almost without their showing any disquietude and vacillation, so that the most observing person hardly notices it until the moment comes when the sweat of anguish appears and they begin to tremble. The mere presence of a European has an extraordinary effect on them, although he neither menaces them nor punishes them. His raising his voice a little, or changing it, his contradicting them or pressing them closely with questions, is enough to convert their fear into a veritable terror, especially in the case of natives little accustomed to deal with Spaniards. This fear or terror of the native furnishes a satisfactory explanation of many of his absurdities, wild answers, and contradictions in which he so frequently indulges, and which can not be otherwise explained.

It is true that he naturally seeks to escape punishment, and with all the kindness in the world denies the evidence, inventing things with astonishing ability, confirming with impassive stoicism one lie with another, and this with a third, until his story becomes utterly improbable. This may be the effect of the poor training which children receive from their parents, who punish them cruelly when they confess their faults and believe them stupidly when they deny them.

They are very reserved with Europeans, and when in their presence so repress and moderate the manifestations of pain or pleasure as often to impose on them. And, if the manifestations of grief readily pass into those of joy, and vice versa, it does not prove that they are insensible to pain, but rather that their impressions are transient, on account of the immense influence which imagination exerts over them. We shall discuss this latter point more at length later. In proof of the fact that they are not without natural sentiments, although they do not manifest them outwardly, we note that parents are most unwilling to consent to a long separation from their children, and that they bring them up with much affection in their own way.

We should also note how great is the influence which the impressions of the sense and the imagination exert over them, particularly among the but slightly civilized people and especially, among the women, who respond to the external impressions which they receive exactly like young children. Wherefore they have been very graphically

described as large children, and in all things they must be treated as such. When under the influence of their imagination it controls them, and produces self-absorption and complete abstraction to such an extent that when they are talking with others they are completely ignorant of what is being discussed, so that it is necessary to sharply call their attention one or more times in order that they may come to themselves and take note of what is being said to them. This also explains many of their absurd and unreasonable replies. Hence the custom widespread among those who have been long in the country of repeating things many times when treating with the natives, and of making them repeat what has been said to them, as well as taking care to avoid giving them many instructions at one time. As as rule when they reply immediately, or do not reply at all even when asked, it is an indication that they are not paying attention, and when they really do pay attention they are slow to reply.

Another effect of their imagination is that they rarely follow out a preconceived plan. Ordinarily they act without forethought, intent only on satisfying their momentary passions, be these what they may, without thinking of results. As a rule it is useless to show them the advantages of employing other means more suited to the end which they seek. It is best to allow them to work in their own way, because they are preoccupied with other thoughts. Thus it is that they ordinarily follow a routine, and so it is that it is said of the Indian that for him there is neither past nor future, for he does not occupy himself with the future, nor do the occurrences of the past serve as a warning to him.

Finally, these and other unfortunate customs of the Indians are largely the result of the bad training which parents give their children, and not the necessary consequence of their nature, which is docile, simple, and, under the direction of others, excellent. There is no lack of examples to prove this assertion. There are many natives who are models of civil and Christian virtues; thanks to the careful education which they have received. This is especially true of girls who have been educated from their early youth in the colleges of the capital. In general, they are not inferior in intelligence, culture, and honesty to European girls, and in certain particulars they surpass them.

ABILITY OF THE NATIVES.

The Filipino Indian is observing and endowed with great talent for imitation. If for serious undertaking and profound intellectual investigation he has neither liking or aptitude above the ordinary, yet he shows himself skilled in the exercise of various arts and industries. In general, he is apt in all kinds of manual labor, and in those kinds involving imitation he has no equal. He is very able in all mechanical arts. He imitates everything and adapts himself to everything, but seldom ever applies himself to anything, nor does he show an interest in perfecting himself, being in fact usually without the necessary means for so doing. Nevertheless he works silver extremely well, and carves wood admirably, with the few and worn out-tools which he employs. Those who profit by the direction of European masters have better tools and produce better results. The Indian is extremely fond of music, and in a short time learns how to play any sort of an instrument, but some of the bands, which are indispensable and

PLATE XXXI.

MODE OF CARRYING CHILDREN.

PLATE XXXII.

FILIPINO WOMAN CARRYING HER CHILDREN.

CIGAR MAKERS AND BUYERS.

exist in every town of the Philippines, are poor because of their lack of knowledge of principles, and many of them play by ear without understanding a single note.

The women are diligent and industrious. Their inclination to commerce and small industries is marked, and they have exceptional ability for weaving, embroidering, and lace making, producing work equal to or better than that of Europe.

USUAL AND MOST FITTING WAY OF LIFE.

What most attracts the attention of a new arrival in the country is the houses of the Indians. They construct them with four to six pillars of hard wood, palm brava, or bamboo, imbedded in the soil. On these they construct a framework of bamboo. The roof and sides are usually made from leaves of the nipa palm. Often the houses are surrounded by bamboo tents, or by intertwined branches, spiny bushes, and other similar things, in order to protect them from thieves and other evil doers. Inside of this inclosure they usually have a little garden around the house with flowers, vegetables, cacao (chocolate), bananas, cotton plant, mangos, reeds, and other plants, and this garden protects the house from fire during conflagrations, and makes it pleasant and cool. They have further a narrow well from 2 to 6 meters deep from which they draw water in a vessel attached to a bamboo pole, or by some other simple means.

The houses have four or more windows, with shutters made of nipa leaves, which are hung on the outside of the house from bamboos. The floor is of small bamboos split and fastened to stringers of stronger bamboo or palma brava. There is often a little platform where are placed various utensils. The rest of their belongings are stored below in the lower part of the house, which may have a little portico which they utilize for a bit of a shop with samples of their wares in sight from the street.

Such are the houses which one commonly finds in the outlying ward and the back streets of the towns. Among such houses cleanliness is apt to be lacking except among the Ilocanos, who are so clean that no European would be disgusted at living in their houses and using their things, poor though they are.

Among the furnishings, which are never abundant, there is never lacking the little altar with images or pictures of saints for use in their devotions. Their stove is a heap of earth. Their bed, a petate or palm-leaf mat. In addition, they may have nets for fishing, and, finally, fighting cocks for amusement.

Furthermore, each one has certain poor appliances for his work, such as carts, farming tools, a room which serves the women for weaving, etc. The draft animals wander about by themselves, and must be caught when they are needed.

The common occupation for this class of people after cultivating their little plot of ground, or garden, or that of their employers is reduced to seeking what is needful for their nourishment and satisfying their daily necessities. The men go to the river, lake, or pool to catch fish with pole or net, often wading in the water up to their waists, and thus contracting fevers and other kinds of sickness. They also go to the forest to gather fruit and wild herbs which they mix with their boiled rice, and this, with a little fish, constitutes their main food sup-

ply. They also gather wood, rattan, palm leaves, and certain fibers for repairing their houses and fences and for fixing their utensils and tools.

They rent their animals and carts if they have any, and hire out themselves with their children for the transportation of crops to the market of the province, deriving enough from this and from their garden products for their ordinary sustenance, and for the most imperative necessities of their life, such as lard, salt fish, bananas, tobacco, and betel nut, as well as for bolos or knives which they use, and other small utensils of iron. It is preferably the women who attend to these matters, as well as to their domestic duties, and they also make fabrics of palm leaves and fibers.

The women also attend to the sale of the products of their farms or their industries, to the purchase of animals, etc., because the women are better fitted for dickering and negotiation than the men. They clean cotton, spin it, color it, and weave it for their domestic purposes. In this work the Ilocano women are models of industry, and the blankets which they produce are highly valued in Manila. Where indigo is produced it is the women who prepare it by an operation extremely hard and unhealthful, placing it in maceration, pounding it, and extracting the juice, which they place in earthen pans designed for this purpose.

Where abacá (manila hemp) is grown it is the women who prepare it and weave it, pounding for days at a time great masses of the fiber in the mortars which serve them for removing the hull from rice. They also practice other small industries, making petates, bayanes (small sacks), hats, etc. They prepare nipa leaves for thatch, extract oil from the cocoanut and other plants, roll cigars, look after the pigs and chickens, irrigate the crops, etc. If there are children, from very early youth they aid their parents, the boys by preference being assigned the duty of looking after the draft animals and to the performance of tasks suited to men, while the girls look after the pigs and chickens, attend to the washing, care for the house and for their small brothers and sisters. Boys and girls, without distinction, share in the work of pounding rice, to free it from the hull, and cooking the dinner. As they grow older they become a great help to their poor parents, whom they usually respect and obey. The girls, from their early years, show great shrewdness and good judgment. They go to the market to buy or to sell their wares, and the smallest of them go around selling refreshments prepared by their mothers, such as tobacco, betel nut, and other trifles. The boys are not so diligent and attentive, and as they grow larger are more inclined to grow lazy and vicious. The people are adherents of the Roman Catholic faith, especially the women, but, being ignorant and uncultivated, they have some remnants of superstitions which they practice almost unconsciously, deceived by the quack doctors, who keep alive these ridiculous traditions of their ancestors without being able to give reasons for what they do.

The lack of education among the children is most unfortunate, nevertheless they go to school more or less, and learn to read a little and write passably.

This is in brief the life of the common Indians, who constitute the great majority of the people of the Philippines.

As for their dress, the men wear pantaloons reaching to the feet,

MAKING THE ROOF OF A HOUSE PRIOR TO RAISING IT.

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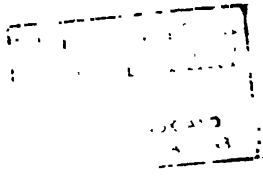
SKELETON OF A NATIVE HOUSE.

NATIVE HOUSE IN COURSE OF CONSTRUCTION, WITH NIPA THATCH.



NATIVE HOUSE WITH THATCHING OF COGON.

A NATIVE HOUSE AND FAMILY.

MORO HOUSES.

W YORK
IBRARY

MORO FARM SHELTER.

[illegible]

and a shirt of colored jeans. They go barefooted, and for hats wear "salacots" of palm leaves. When at work they strip off the shirt, which annoys and heats them, and roll the pantaloons above the knees, or else use short breeches. They wrap a handkerchief about the head. When fishing, or planting rice they wear only a clout. They always wear a belt of cloth or woven rattan in which they keep some small effects, and from which hangs a bolo in a sheath made of two pieces of bamboo bound together by rattan or other fiber. About the neck they wear a small joint of bamboo with the cedula personal, as well as a little rattan case for betel nut, tobacco, etc. Almost all of them have a rosary, or scapulary of the Holy Virgin.

The costume of the common women is a camisa of jeans, white, black, or brightly colored, or a skirt, a species of sack without a bottom, which is fastened about the waist and reaches to the ankles. They have no overskirt nor underclothing. In addition there is a short skirt used less frequently by the Visayan women, which is worn inside the saya, fastened at the waist, and reaching below the knee. The hair is combed back and secured in a knot at the back of the head, which is covered with a folded handkerchief, the two points of which are tied together in front. They also wear a sort of black veil when they go to church; it reaches to their waist, and in the case of the Ilocano women, to the ankles.

THE MORE HONORABLE OCCUPATIONS.

For the rest the employments, occupations, and pursuits of those who constitute the most enlightened class, or who have much to do with foreigners in the principal cities, are as various as are the employments of the common people in the cities of Europe. The education which they possess may be compared with that of some civilized countries, while comparison with the state of affairs existing in other native towns in Oceania will not reflect discredit on a Filipino.

VARIOUS CUSTOMS.

Although the indolence of the Indians is traditional, and some of them do, as a matter of fact, give up their time to vice and vagrancy, there has been not a little exaggeration in this matter. The lack of public works and of opportunity to work during the day contributes in large measure to the laziness of the Indian, and if their work in the fields is not very productive, the fact is due to the small inclination which they have for toiling in the fields, which they undertake as a matter of pure necesssity. Nevertheless, if one observes a native practicing any profession, he will agree with us that a man who, in an enervating atmosphere and a very high temperature, nourished by a little rice and a few fish, works for eight or ten hours a day, deliberately, to be sure, but without sign of weariness or fatigue, is not so bad a hand for work after all. As a rule they are active and arduous, and they do not lack bravery in facing the dangers of the sea. They are excellent sailors, and active in the management of cords and sails, a fact which is of importance to them since they live in large measure on the shores, streams, and lakes. They are very frugal at their meals, which consist of a little boiled rice, sometimes with the addition of a few herbs and saft fish, all eaten with their fingers. They count themselves happy if to this they can add a bit of meat. They are very fond

of dainties, especially of roasted sucking pigs, which constitute one of the necessary dishes at all their feasts, which are magnificent and wasteful; vanity, their dominant vice, plays a great part here.

Their delight in feasts and spectacles is very great, and for weeks at a time they give themselves up to comedies, music, artificial fires, attended with great noise, and to cock fighting, which to them is the most attractive of their diversions. The cock is their favorite possession, and they exploit him in the fight, which serves them as a pretext for gaining, or for losing everything that they have at hand. Games of chance, lotteries, and raffles have a singular attraction for them. They never regard these things as pastime, but regard them as a means for obtaining a living. They do not care for honest sports and recreations as a rule. Although they bathe very frequently, some of them daily, for the rest they are not very cleanly and scrupulous. Nevertheless, during their feasts they display a luxury which is in contradiction of their habitual way of living.

Their marriages are celebrated with Catholic rites, for the Indians have no other religion than the Roman Catholic.

It is still a custom for the prospective bridegoom to live in the house of the parents of the bride, and to serve them without pay for some time before the marriage. The greater his supposed inferiority to the bride in personal gifts, or in fortune, the longer his period of service.

When sick they prefer the help of curers who sometimes employ foolish and dangerous remedies, and at others make use of plants of the country that are really efficacious; but they always give assiduous attention to the sick man, and the care which they give him is admirable.

When a person dies the disturbance which suddenly arises in the house is remarkable. They all break forth into disorderly lamentation, acting as if they were out of their heads. Furthermore, at times the father or spouse becomes so beside himself that he snatches a stick or a bolo and slashes to the right and left at everything within reach, destroying clothing, furniture, utensils, and even the floor of the house.

Senor La Calla says:[1]

> If one takes into account the influence of a tropical climate, and the simplicity of custom in a life where the house, the food, and everything, in fact, is in common, it ought to surprise no one that the laws of modesty are infringed more frequently than in the countries of Europe. On the other hand, it is worthy of note that there is a certain instinctive reserve which keeps the native from the scandal of a dissipated life. Frugality in the matter of food and the influence of religion are the agencies which contribute to keep these natives from evil practices and usages which are to-day prevalent in almost all the remainder of Oceania.
>
> It is worthy of note also that another characteristic renders the Filipinos superior to many Asiatic and Malayan peoples. Paternal love is one of their ruling sentiments, and the father and mother watch with affectionate solicitude over the little ones, whom they surround with every care.

They are hospitable by instinct, and it readily happens that he who has a house and food places both at the disposal of anyone who chances to come along, even though he be a complete stranger. This characteristic, good in itself, is carried to extremes, as a result of the innate timidity and weakness of character which can not deny anything to anyone. Not only do they show their hospitality to relatives and

[1] In the work entitled Tierras e Razas, Part II, Chapter I, Article III.

FISHING IN A TIDE-WATER CREEK.

P O—VOL 3—01——41

DRAYMEN IN MANILA.

CALESA (TWO-WHEELED GIG).

ASTOR
THE NEW YORK

FILIPINO PONY AND CART.

FILIPINO EQUIPAGE, COMMON IN MANILA.

A CARROMATA.

CART COMMONLY USED BY THE NATIVES.

THE NATIVE HORSE.

THE
PUBLIC
ASTOR
LENOX FOUNDATIONS

acquantances, but also to strangers, concealing the disgust or inconvenience that it occasions them. As a result, vagabond Indians everywhere find food and shelter, wandering about and making long journeys without spending a cent. They even lodge evil doers in their houses, and in spite of the trouble it occasions them, satisfy them with everything they have and can not conceal from them, showing a pleasure which they do not really feel in their company.

They receive the importunate visits of their countrymen and others without its occurring to them to ask the reason for them, nor do they venture to send them away, although they give rise to inconveniences.

Ambition holds little sway over the common people, who, strangers to the cares which so preoccupy the rest of mankind, live satisfied and happy with what they have and with what the country in which they were born furnishes them. From this it results that if they succeed in satisfying the appetites which they feel for the moment, they cease to worry, and have no care either for to-day or for to-morrow.

CONCLUSION.

It would be possible to refer to many other usages and customs of the Filipino Indian which are of considerable interest, which we, however, omit intentionally in order to avoid prolixity; noting only this, that inasmuch as the character of the Indian is very different from that of the European, as are his inclinations, certain authors have believed his character incapable of description, and entirely incomprehensible, and have thus stated in their writings. It is certain that there is much exaggeration in all this. We have attempted here to set forth his leading characteristics, from which the judicious reader can derive sufficient knowledge of the native in order to maintain the social intercourse which may be necessary with him.

PAPER NO. IX.

ETHOLOGY.

ETHOLOGY.

USAGES AND CUSTOMS OF THE NEGRITOS FOUND IN THE PHILIPPINES.

CUSTOMS WHICH ARE MOST WIDESPREAD.

Whatever may be the name by which they are designated or the regions which they inhabit, an irresistible tendency toward a nomadic life has always existed among the Negritos. The result is that they are almost perpetually wandering through the dense mountain forests in small groups of families, and are without any fixed abiding place. They sleep wherever night overtakes them, under some tree, or in a wretched hut, which they improvise with a few sticks. They constitute a nomadic and savage people, in which we often meet with indications of ferocity which separate these peoples from civilized men. Nevertheless, when they are treated with gentleness and kindness they show good characteristics, and, if they are not molested, they do not interfere with others.

They go almost naked, with no other clothing than a small clout, which they fasten at the waist after the fashion of an apron, or in some other way. The women use an apron which is somewhat longer than that of the men. When they feel the cold in the mountains they wrap themselves in pieces of blanket, which they throw off again when the necessity for them has passed.

They never arrange nor cut their woolly hair, which is allowed to grow naturally, and which gives the Negritos a strange appearance.

It is very common among them to use as ornaments bamboo combs, rings, rings or bracelets, with strings of bat skin for the legs, collars of brass, and sometimes strings of glass, and rings of iron or copper wire for the ears and for bracelets. It is their custom, also, to tattoo the body in various ways, and some of them make deep incisions in their skins, which they then color with a bright blue substance, or in some other manner, and the scratches and broad scars which result are their most highly-valued adornment.

As a rule, they construct no permanent habitations. They sometimes place large quantities of leaves on the branches of trees in order to protect themselves from the rain, and with this they are contented. Their household utensils consist of a few cups, which they obtain readily by utilizing cocoanut shells and large sea shells, and rude boxes of wood in which they keep their buyo, and a few belongings of little value.

As a rule, they do not make use of lances nor spears, but employ only the bow and arrows, which they use with unequaled skill, and which serve them on occasion as a weapon for the hunt or for war.

They pass many of their leisure moments stretched out upon the grass, and singing and dancing in a large circle, leaping about with surprising agility.

Their business amounts to an exchange of wax, honey, and other forest products, for rice, tobacco, and small objects and trinkets which the inhabitants of the neighboring places offer them in trade. They are very skillful in hunting and following and killing deer. Their food is both animal and vegetable, but is insufficient in quantity. Roots and fruits, game and fish, furnish them subsistence, which is sometimes augmented by the products of a few small patches of cultivated ground which they work in the mountains.

Their intelligence is not so limited as is ordinarily believed, as has been learned from certain individuals who entered into domestic service with the Spaniards.

Particularly noteworthy in the case of the Negritos is their custom of considering marriage as indissoluble and not to be broken under any consideration, which is quite the reverse of what is observed in other wild Philippine races.

They show very few signs of possessing a religion, merely observing certain principles which indicate a belief in spirits, a fact which is also proven by the respect in which they hold the dead, whose burial places they inclose and keep from profanation by neighboring tribes.

So much for the customs which in general distinguish the representatives of the Negrito race.

In adding now some details in order to complete the picture of these peoples, it will be convenient to add descriptions of certain tribes which are most conspicuous and worthy of being known.

CUSTOMS OF THE ATTAS.

As has already been said[1] these are the Negritos which inhabit the mountains of the province of Cagayan, in the north of Luzon. Concerning them, Father Pedro de Medio has written as follows:

The dress of the women is reduced to an apron, which is tied about the waist. It is ordinarily more or less dirty, but is of the most gaudy colors possible for the few days during which it is kept clean. The men in the hot season do not trouble themselves much about clothing, believing that they are treating their bodies extremely well if they adorn them with a simple cloth. In the cool season they envelop themselves with a piece of condinían, wrapping it about them like a blanket. It presents the appearance of rags more or less dirty. In the matter of food they are as easily satisfied as in the matter of clothing. The depths of the forest provide them with roots, tubas, and vegetables in quantities sufficient to appease the severest attacks of hunger, and when they desire to present themselves with more, they hunt deer and wild hogs, and even birds, which they kill with arrows, managing them very dexterously, since they use the bow from childhood. Robbery, also, is for them a very useful method of maintaining themselves, and they may well be counted as among the plagues which the agriculturists in the neighboring towns have to fear (although the Colingas may be characterized as extremely lazy, the Negritos show this trait to a much higher degree, and may be considered the incarnation of laziness). There are a few settlements far within the large forests whose inhabitants take the trouble to cultivate tiny fields near streams, but the cultivation is conducted on so small a scale that it seems like play. Indian corn is almost the only thing which they plant, but there are those who do not even know this, and they are, perhaps, in the majority. Even when they have cleared a small field, it is fashionable to abandon it in a short time.

Although the dominant inclination of the Negritos is to wander through the deep forests, they may yet be divided into two classes—one totally nomadic, the other constituting villages which consist of a very small number of houses. The latter have their mayors and petty officials of justice, which are named by the gobernadorcillo of the township in whose jurisdiction they are located. Care is taken, how-

[1] See the Ethnological table, page (at the end of Chapter I, Part II).

ever, to appoint some one who will meet with general approval. It has sometimes happened that some Indian or other, shrewd and daring, and accustomed to frequently visit their villages and treat with them, has become a lord to some one of his devoted Negritos, and eventually he is known and respected by this name to the remainder. Even the class of which we speak is wont to change with great frequency the situation of its cultivated fields and villages.

There are other Negritos wholly nomadic, wandering through the forests, two or three families together, and sleeping at night under an improvised thatch of bamboo and leaves, or even in the top of some tree, or on the bare ground during the dry season.

There are Negritos who go to live near some Christian town in order to carry on in the houses of its inhabitants, or in their fields, some little work, such as pounding rice, caring for crops, or other affairs of the sort; but this is only temporary, and when they have need of corn, with which the Christians are wont to pay them, or of a few yards of cloth, brightly colored, but of little value. In places where the ground is favorable they choose the most elevated point, in order to construct there their little settlements. This, however, unfailingly remains abandoned within a year on account of the inveterate custom of these infidels not to remain in any one place.

As for the customs and inclinations of the Negritos, it is not easy to learn to know them intimately, because no one can keep track of them except themselves.

THE NEGRITOS OF SOUTH CAMARINES.

Considerable interest attaches to the following data concerning this group of Negritos, furnished by Father Eusibio Platero, a Franciscan monk, who knew them personally:

They are docile, idle, stupid, and they do not build anything but huts of very delicate poles, about 2 yards high, which they fasten together at the four angles, cover on the sides and top with palm leaves, and at the height of about 2 feet arrange a floor of very delicate poles somewhat separate from each other. They do not cultivate the fields nor sow anything but a few sweet potatoes. They hunt deer, wild hogs, and monkeys with their only arm, the arrow, which they use with skill. The only animal that they raise is the dog, which they feed only with the intestines of the game that they kill, skins of sweet potatoes, and now and then a raw cocoanut, so that the dogs are thin and wretched, but they run well, and do not cease barking, possibly stimulated by hunger.

The men go almost naked, and either wander through the forest or come down to the town, although the Negritos of pure race seldom do this. The native of Isarog frequently does it. He also wanders naked through the forest, but when he comes down to the plains appears clothed like a wild Malay. The men do not wear ordinarily any other clothing than a cord drawn tightly about the waist, from which, before and behind, there hang rags, with which alone they cover their nakedness. The women make use of a sort of circular apron. They do not use clothing to protect themselves (from cold), and when they sleep they are not accustomed to spread over the floor either petaks or other mats. In order that gnats may not torment them, and that the cold of night may not harm them, they maintain fire below the house constantly, which literally toasts them, so that as a result they have their whole bodies covered with scaly excoriations, which are very repugnant, and furthermore they are covered with small parasitic animals.

When they get hungry on account of the lack of game, they present themselves to cultivate abacá or to aid in harvesting rice, and they work in the abacá plantations for their food and for a few handfuls of recently cut rice in the rice fields. They go two or three days almost without eating and then come back to work again.

The Negrito frequently has more than one female companion at a time, but only one is the true wife; the others are held as slaves, and are usually those who have been left without companions by death or are female relatives who were repudiated and who have not contracted a new alliance.

To their children they give the name of the places or the plant near which they are born, or that of some bird or snake.

The most solemn function among them is the burial of their dead. When a death occurs notice is sent around; those who are in the neighborhood gather together and bring with them the game which they killed while on the road, and when they have arrived where the body is, which they envelop in the thick bark of a certain tree taken off entire, they close the ends of the package with a mixture of earth and resinous gum, by which operation the body is hermitically sealed up, and they leave it unburied many days. When they have arrived at the place where the body is

they celebrate their gluttonous feast and get drunk on tuba. When all the conveniences for a big time have been exhausted, they proceed to the burial which takes place in a vertical ditch. The dead man is placed on his feet. They then cover with earth the grave, which they make underneath the house, burn the house on top of it, and the tribe disperses.

NEGRITOS OF THE ISLAND OF NEGROS.

Of this tribe Father Cipriano Navarro writes as follows:

These unfortunate human beings have no home nor fixed abiding place. All day they wander through the forests. When night overtakes them they sleep often in trees. They do not have any intercourse with those around them, and the only time when the Christians make out to have any communication with them is at the season when they gather wax. According to the statements of the Christians, they are liars and do not keep their contracts. The only way to get anything out of this race, either in the case of men or women, is to take them when they are very young. Two cases have come to my attention, and from them some conclusion may be drawn favorable to this unfortunate race. One of these instances showed that in youth, at least, they possess noble and very generous and honorable sentiments.

The first instance is that of a Christian Negrito called Joaquin, who, having been baptized when he was very young, was a servant in the house of a Spanish couple in the province of Cebu. Under their paternal control he lived for more than twenty years, serving them faithfully and affectionately. When his master finally died he transferred his home to the forests of Escalante, in Negros, living among the foothills of the solitary peak called Pinac, on the river Danao. It is said that he wore pantaloons and a shirt and had a string of glass beads around his neck.

The second case is that of a little Negrito girl, 4 or 5 years old, who was given the name Clementina, and supported by a Spanish family of some rank, lived happy and contented with her patrons. This family finally went to the Peninsula, and, having passed some years in Cadiz, the wife died. So great was the sorrow and pain of the Negrito girl that at the end of six days she died of grief.

From what we have said of these tribes more can be inferred. In order to avoid prolixity I do not go further into particulars.

USAGES AND CUSTOMS OF THE INDONESIAN TRIBES.

OBSERVATIONS.

As the rites and customs which distinguish the different pagan tribes of the Indonesian race are very various,[1] it is not easy to gather together the customs which are widespread and characteristic of all the peoples. For this reason we shall limit ourselves to giving in the present chapter a description of certain tribes which are especially interesting, or which for one reason or another are of greater importance, making a note of their inclinations and characteristics, so that one may readily through these tribes come to know something of the remainder, which for brevity's sake we omit to mention.[2]

SHORT ACCOUNT OF THE MONTESES, OR BUGUIDNONES, OF MINDANAO.

According to the Jesuit father, Parache, this tribe is of prime importance among the peoples which populate the island of Mindanao, on account of its nobility of character and its cheerful and natural disposition.

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[1] See the ethnological table at the end of Chapter II, of Part II, page

[2] A detailed account of the usages, customs, and characteristics which distinguish the various tribes inhabiting the island of Mindanao may be found in an interesting work, profusely illustrated, which contains accurate information concerning them, since it is being written by various Jesuit priests who have had the different tribes in charge. It is at present in course of preparation.

The Monteses, like nearly all of the remaining pagans of the island, have a more or less vague notion of a Supreme Being, the Creator of all that surrounds them; and, furthermore, they believe in an evil spirit, which they fear and attempt to propitiate. But in actual practice they worship idols as numerous as are their desires and the evils from which they wish to escape. They think that they meet and see spirits in the rivers, the trees, the mountains, and in the rocks, and it is common to find in such places a little table or altar with offerings which they have left as a sign of recognition or supplication. To him whom they call "Taguibanua," or Lord of the Earth, they are accustomed to offer presents at the time that they plant their fields, and they offer a feast of thanksgiving to him when they harvest their crops. They have superstitions and idol observances in great number, as is true of the other pagan tribes. They believe in the immortality of the soul, being convinced that their ancestors see them and visit them, wherefore they themselves invoke them and invite them, giving them a place and participation in their feasts, whether joyful or sad. They have no permanent places of worship; they improvise them when and where they believe it necessary.

The Monteses have shown upon occasion that they are sensible and not bloodthirsty, and they display a marked tendency toward a social and well-ordered life. They have a high consideration and appreciation of the principles of authority, which they have defined on various occasions with singular fervor against the Monobos, from whom they took many slaves, and against the Moros of Lake Lanao, as well as against those under the command of Uto on the Pulangui River, with whom they were always successful. It is a proof of their loyalty and valor that the Jesuit Father Ducos, in those great and toilsome marches which he made to break the boldness and pride of the Moros, chose to take to accompany and aid him these Monteses, together with the reduced Spanish militia, which he commanded as chief; and there are yet descendants of the head men who earned from the Spanish Government Maestre de Campo, under date of 1754, and, to touch upon recent events, in 1891 these same Monteses, directed by Father Eusebio Barrado, S. J., their missionary, armed with shields, lances, and campilans marched bravely to attack a force of Moros that was drawing near, and the latter fled in terror.

A little later when the Spanish troops set forth from Iligan for Lanao, General Weyler desired to test them, ordering the same Father Barrado to make a reconnoissance toward the Moro settlements nearest Bugcaon and Sevilla. This second expedition was made up of 330 Monteses, 60 of them armed with rifles and the remainer with lances. The expedition lasted eight days, and reached the sources of the Manuruñgas, a situation near the lake.

The Monteses live in towns, especially since 1849, in which year the governor of the district proposed that they should enter upon the social form of life, which they have kept up for the most part, in spite of not having anyone to watch over them, nor missionaries. The latter they did not get until forty years later, when they themselves in considerable numbers went in search of a priest three or more days journey distant, in order to explain their affairs to him and come to an agreement with him.

During all this time, without being compelled to do it, with an armed force, they of their own accord took a census of themselves every year

and presented the lists to the government, receiving in turn the titles of citizens.

As regards the matter of marriages and burials, their customs differ little from those of the other tribes of the island. In matrimonial contracts the man has to buy the woman, and pay for her by rendering personal services or with money, slaves, or other valuables. Nevertheless, cases may occur in which the parents being less needy, or well to do, the parents of the two contracting parties make an arrangement together which is more dignified and honorable. It also happens that if the married pair become weary of each other, and if what the man paid for his wife is returned to him, they separate, each one going his way as if there had been no contract.

Polygamy is not very common among them, and is much less frequent among them than among the Mandayas and Manobos.

In their agriculture, industry, and commerce they also lead. They employ the plow in their agricultural operations, which are various. For instance, they raise rice, indian corn, and mangos, as well as various nutritious roots and tubers. They know how to preserve sweet potatoes and bananas in a dry state against the time of need, and of the sugar cane they make a species of rum or wine, which they employ extensively. Their principal products, abaca (Manila hemp), coffee, and cacao (chocolate), which they bring down in great quantities to the merchants who come to their coast. Tobacco is another product which brings them great revenues, and they produce a grade of excellent quality. Chestnuts and acorns are found in their forests, the latter of poor quality, but might be improved with cultivation. The former are indistinguishable from those which come from China. They also have honey and wax in abundance.

In addition to what has been enumerated there are within their territory mines of gold, which they readily obtain in powder and in quite large grain. These mines are in the town of Oroquieta, in the direction of the Rio Pulanqui.

They know how to make excellent steel weapons, which have the reputation of being well tempered. Especially is this true of those which come from the town of Calasungay. Furthermore, they make from nito and rattan fine hats. Coats of mail for a defense against the lances of their enemies are quite common among them, and some of them are very well made, with plates of buffalo horn and brass wire. They have probably captured them from the Moros. They also use, as a safeguard against accidents, a sort of jacket made of rattan and stuffed with cotton.

On account of their frequent communication with the natives of the Christian towns, they have gone on gradually becoming more civilized and inclined to the usages and customs of civilized people. Thus it is that many of them dress like the later people, wearing hats, shoes, good pantaloons, coats or jackets, etc. In their houses those who can do so use lamps of porcelain, sewing machines, and other articles which show their character. According to Father Parache, from whom we obtain this information, rain coats were seen among them, as well as spatterdashes, and one of the headmen even had a revolver. Their number is probably in the region of 13,000.

NATIVES WASHING.

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DRYING CARABAO MEAT.

TAGALA GIRL SELLING MANGOES.

TAGALA WOMAN IN USUAL NATIVE COSTUME.

GROUP OF TAGALOGS CARRYING MILK.

NATIVES CARRYING MILK.

THE NEW YORK
PUBLIC LIBRARY

ASTOR, LENOX AND
TILDEN FOUNDATIONS

BED COMMONLY USED IN THE PHILIPPINES.

ARMS USED BY THE FILIPINOS AND CHURCH BELLS FOR MAKING CANNONS.

PAPER NO. X.

IDIOMOGRAPHY.

IDIOMOGRAPHY.

OBSERVATIONS.

As the mode of speaking portrays the human individual with all his personal characteristics better than any external manifestation, so the most distinctive and noteworthy characteristic of each people and race is its language. Hence it may be said with truth, the style is the man and the language is the race. In consequence of this fact, when a student verifies with care what have been the primitive elements of a language, what has been its progress and its mixture with other tongues allied to it or entirely different, he will certainly come to know the origin and vicissitudes of the nation which has used it as its own. We have, therefore, wished to give up a part of this treatise to idiomography, and we shall begin by discussing in the following chapter the ancient alphabets of the Philippine peoples.

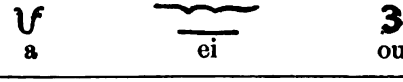
CONCERNING THE ANCIENT ALPHABETS OF THE PHILIPPINE PEOPLE.

THE PRIMITIVE WRITING.

It seems to be true that the first inhabitants, or in other words the Negritos, did not have letters of their own. At all events there have not come down to us any traces of such signs, nor do we find mention of them in old or recent writings.

The Indians, that is to say, the second set of colonists who came to the islands, used characters of their own, by means of which they wrote and made notes of their affairs on thick joints of green bamboo, palm leaves, banana leaves, and leaves of other trees, using for the purpose an iron point, a knife, or something of the sort. The Jesuit Father, Chirino, the oldest of the historians, explained their alphabet as follows, in the first work published concerning the Philippines:[1]

The vowels are three, but they serve as five, and are



a ei ou

[1] Relación de las Islas Filipinas y de lo que en ellas han trabajado los Padres de la compañia Jesùs Roma I. 604. Cap. 17.

The consonants are but twelve, and when written serve for consonants and vowels, as follows: The letter alone, without a mark above or below, is pronounced with A.

Ba	ca	da	ga	ha	la	ma	na	pa	sa	ta	ya

When a comma is placed above, each consonant is pronounced with E or I.

bi	qui	di	gui	hi	li	mi	ni	pi	si	ti	yi
be	que	de	gue	he	le	me	ne	pe	se	te	ye

Putting the comma below, each is pronounced with O or with U.

bo	co	do	go	ho	lo	mo	no	po	so	to	yo
bu	cu	du	gu	hu	lu	mu	nu	pu	su	tu	yu

So that to say cama (bed) two letters without marks are sufficient, as follows:

ca	ma

spells que ma (burn), and co mo (I eat).

Final consonants are supplied in all the words; for instance, cantar (to sing) would be written as follows: ca ta beard ba ba

If the point be placed over the we get que ma (burn), or placing the two points under both characters we get co mo (eat).

The fashion of writing was not everywhere uniform, and it might rather be said that various alphabets and modes of writing were in use. Each dialect had its own, differing more or less from the others. Furthermore, sometimes authors who treat of a single language differ in their way of forming the various characters, and some give more, others less; which, apart from the greater or less individual ability in tracing them, should not occasion surprise, but is rather quite natural, taking into account the fact that they wrote at different times and in different places—for said differences, as well as others in the language, would undoubtedly result from the old inhabitants having lived in isolated groups, without much social intercourse with each other.

The differences which we have just noted are shown by the accompanying six alphabets, which we place together in order to facilitate comparison. See accompanying paleographic table.[1]

TAGALO	BISAYA	ILOCANO	PAMPANGO	PANGASINAN	TAGBANUA	EQUIVALENTE
						a
						e, i
						ow
						ca
						ga
						nga
						ta
						da
						na
						pa
						ha
						ma
						ya
						la
						wa
						sa
						ha

A SINGLE ALPHABET.

One can see at a glance that these alphabets do not differ in the phonetic value of the signs, but only in their number and in the way in which they are formed. Hence various authors reduce them to one. For instance, Don Isabelo de los Reys says:[2] "The different Philippine alphabets very greatly resemble each other, wherefore I think that in

[1] The Tagalog alphabet is that of Father Chirino, modified by Thévenot in his Relation des Isles Philippines. The Bisayan alphabet follows that given by Father Ezguerra, S. J., in his Arte de la Langua Bisaya, Manila, 1747. The three following alphabets are taken from the work of Don Sinibaldo de Mas, entitled Informe sobre las Islas Filipinas, Madrid, 1843. Finally the Tagbanua is due to Dr. Pardo de Tavera.

[2] See his Historia de Filipinas, page 19.

this archipelago a single alphabet was used." What is this single alphabet? The Augustin Father Marcilla maintains that it must have been the Tagalog.[1] This opinion would seem quite probable, for Father Chirino, in the work previously cited, calls his characters "letters belonging to the island of Manila," and of the Visayans he says,[2] "Nor did they have letters, for they took them from the Tagalogs very few years since."

As to the Ilocanos, Father Marcilla writes:

> Since the Ilocanos have originated from the Tagalogs, they received their writing and their languages from them, and although with the passage of time this was transformed and constituted a distinct dialect, since the structure of the two languages is the same, there would not have been any necessity for the Ilocanos to invent new characters, since they could write their ideas with the Tagalog characters.

Further, it is worthy of note that the first booklets in Ilocano are in Tagalog characters, because these, as their authors note, were in common use.

And if the Visayans and Ilocanos did not have an alphabet of their own, with more reason the same may be said of the other peoples, concerning whom there is less doubt, as everyone admits.

Finally, in ancient writings we do not find mention of any other alphabet than the Tagalog, which ought to be sufficient, although up to the present there are neither documents, tablets, nor inscriptions, nor is there anything with reference to those natives who undoubtedly were the aborigines of the country.

It seems to be clear, when one attempts to determine the origin of the races, that the tribe or nation from which the Tagalogs came enjoyed from the beginning, or at the time of establishing itself in the archipelago, a higher degree of culture than the other Philippine peoples which did not have a system of writing or, at all events, had a more rudimentary one, and accepted the Tagalog, abandoning their own, which would not have occurred had not the latter been more useful.

COMPARISON WITH OTHER ALPHABETS.

In the question of the resemblance of the Philippine alphabet to others in India and Oceania there are various opinions among authors who are wont to decide according to their personal ideas as to the mother tongue. In order to avoid confusion we show six alphabets,[3] to each of which the origin of the Philippine alphabet has been attributed, in order that the reader may compare for himself. (See paleographic table.)

It will be noted that the Toba is, perhaps, the one which most closely approaches the primitive Malayan alphabet. It comes from the interior of Sumatra, where are found the lake and little table-land called Toba, whose inhabitants are Battacs and pure Malays.

The Asoca is the oldest Indian alphabet used in the edicts of King Asoca, who, according to K. F. Holle, lived five hundred years before Christ.

Finally, the Buggí is peculiar to Celebes.

It will be readily seen that the Visayan alphabet is more like the Toba than like any of the others.

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[1] See his Estudio de los Antiguos Alfabetos Filipinos Malabón, 1895.

[2] In his Relación, chapter 16.

[3] They are almost identical with those which Don Isabelo de los Reys publishes in his pamphlet, Los Islas Bisayas.

From this comparison it may perhaps be concluded that all of these alphabets come from a still older one, which has disappeared, in part at least, and which was more like that of the Battacs than any other. A similar conclusion was reached bv Don Isabelo de los Reys, after

BISAYA	TOBA	BUGUÍ	ASOCA	BORNEO	JAVA	EQUIVALENTE
						A
						B
						D
						E-I
						G
						H
						K
						L
						M
						N
						NG
						OU
						P
						S
						T
						V
						Y

examining nearly all the alphabets of India, Malayasia, and other countries of Asia and Oceania, as set forth in the curious Tabel von onden Indische alphabetten of the Dutch author K. F. Holle.

ORTHOGRAPHY OF THE PHILIPPINE ALPHABET.

By the author above cited[1] "each consonant is pronounced with the vowel A if it has no additional orthographic sign. So that, for example, if we write the letters for L and B alone, we have lába without necessity of writing the A's.

[1] Op. cit., page 84.

The Malays suppress the vowel before the last consonant of words, and generally write only the accented vowel, omitting the short vowel.

If a consonant has over it a sort of accent called corlis, it has the same value as if followed by one of the vowels E or I, which were equivalent among the Visayans. So that L and B with corlis over them would spell lebe or libi. This accent was called corlit among the Filipinos in general, according to the authorities, but among the Visayans I believe that it was called corlis, which signifies a mark made with something that cuts, according to the dictionary of Father Encarnacion, which indicates the nature of the primitive writing instruments.

If the consonants had the corlis below it was to be supposed that they would be pronounced with U or O, which for the Visayans were one letter. Thus L and B with corlis below were pronounced lobo or lubu, as one pleased.

The Malays also make use of commas or periods, which they place above or below the consonants, in order to indicate the presence of vowels and the sound which should be given them. They also stand for E or I if placed above, and for O or U when written below; while if placed before A is the vowel supplied. They are called Di-adapan in Malay.

From which it may be inferred that the Visayans did not use vowels except at the beginning of words, as in Ogod, or when they were written alone, as in the Visayan exclamation A, or when they form diphthongs, as in Liloan, which is written L with corlis over it, L with corlis below, and an A.

In this case the readers would supply at least the final N. If written without the corlis the above word would be read Liloana. That is to say, an A would be supplied after the N, because it was conventional to suppose that every consonant would be pronounced with A when it did not carry a corlis with it, while if it carried one it would be pronounced with the other vowel, according to whether the corlis was above or below.

REFORM OF TAGALOG WRITING.

This supplying of final consonants in the writing peculiar to the Philippines must have made the reading as much more difficult as the writing more easy, or even more so, because the reader was forced to supply from the sense of the context the sounds of those consonants which were suitable in each case. Habit, however, or some conventional sign of which we know nothing must have greatly facilitated writing when Father Chirino wrote of his time as follows:[1] "Nevertheless, without much difficulty they understand and cause others to understand in a marvelous manner, and he who reads supplies with great dexterity and facility the consonants which are lacking." This might be said undoubtedly of the good readers, but of them only, for from that time on this point has occasioned great difficulty. Hence the Augustinian Father Lopez was compelled to seek means for facilitating reading. "The necessity for placing the text of the Doctrina[2] in Tagalog script, which is the one most commonly used in these islands, was the occasion for the improvement of said system of

[1] Op. cit., Chapter XVII.

[2] This Doctrina was a small catechism and treatise on Christian doctrine. He wrote it in Ilocano, but with Tagalog characters, and used his reform method. Father Marcilla reproduces the first page in his work already cited.

writing, which of itself is so poor and so confused through not having any way of writing consonants which are not pronounced with vowels, that to the most well-versed linguist it causes trouble, and gives him plenty to think about in the case of many words, in order that he may give them the pronunciation which the man who wrote them ntended. This is the opinion of everyone."

A little farther down the same author explained his reform as follows: "With only a cross (✠) written with the consonants the writing is as complete and exact as the Spanish, if it be considered that the ✠ frees the consonants of the vowels, which, according to the old system, were attached to them so that they are pronounced by themselves. For example, the letter [illegible] with the cross below it is equivalent to T. In order to write the word surat it would be spelled as follows: [illegible]"

With this simple modification the interpretation of Tagalog writings is as easy as the reading of our own characters, for all the sounds are expressed, vowels as will as consonants.

Although in the matter of number of consonants various ones were lacking for the expression of the sounds of certain words, this occasioned them little or no trouble. In place of F they used a P and thus they wrote fuego instead of puego. Y took the place of LL, and they said Yuvia instead of LLuvia. They used a similar method in writing other words, supplying the sounds for which they had no characters with other similar sounds, a defect which they retain until to-day, for a similar misuse of consonants is still to be heard among the Indians.

DIRECTION IN WHICH THE WRITING IS FORMED.

On this point there is a difference of opinion. Without discussing the different views, suffice it to say that the probability is that they wrote from below upward in columns or vertical lines, beginning at the left and ending at the right. Father Colin, S. J., states plainly that this was the case.[1] Father Martinez Vigil confirms this statement, and he had before him a most valuable manuscript of more than 600 pages on Chinese paper, written in 1609. He makes the following statement: "I can confirm this, because I have examined these books."[2] Father Ezguerra writes as follows:[3] "They were formerly accustomed to write from below upward, and many of them still do it, putting the first column at the left."

On the other hand it seems certain that some of them wrote horizontally from left to right, and there are examples of it, but this direction was by no means the primitive one, but was used later and was learned from the Spanish.

On account of the lack of authentic documents we can not now definitely ascertain whether the direction in which these natives wrote was or was not the same as that employed by the Malays. If we accept the opinions of certain authors, it is probable that the former took the direction from the latter, together with the form and the letters of their writing, but we have no old manuscripts belonging to the Malays, for they have long written in Arabic.

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[1] Father Martinez in his Labor Evangelica, Madrid, 1663, p. 54.
[2] In an article entitled La Escritura propria de los tagalos.
[3] On the first page of his Arte already cited.

MODERN WRITING.

The old Philippine alphabet which we have thus briefly discussed was promptly abandoned by many who adopted the Spanish alphabet and language, and little by little all abandoned it, as the Spanish domination was pushed to conclusion, and communication with the natives became more frequent. As to the ancient characters, Father Totanez wrote in 1745 that "It is rare to find an Indian who knows how to read them, and extremely rare that one knows how to write them." It may be said that they are not even remembered.[1]

THE RELATIONSHIP BETWEEN THE DIFFERENT PHILIPPINE LANGUAGES AMONG THEMSELVES AND BETWEEN THEM AND THE MALAY.

OBSERVATIONS.

It may be said that the languages or dialects which are spoken in the Philippine Archipelago are as numerous as the tribes which inhabit it. They display in a wonderful way by the confused mixture of foreign roots of words the confusion of races which, as we have already said, has been brought about in the Philippines by long-continued and constant crossing between very distinct peoples. It has been further noted, and not without surprise, by all who have obtained definite information concerning a considerable number of these languages, how intimate is the relationship which nearly all of them display to each other and to the Malayan tongue.

THE LANGUAGE OF THE NEGRITOS.

We said "nearly all," because it would not seem that the language used by the Negritos displayed this similarity, as we shall show in the proper place. It is the belief of a number of authors that it differs conspicuously from all the others. Among old authorities we shall cite only Father Chirino, who says:[2]

> There is no one language in the Philippines, as all the languages are so similar that one can understand and speak a new one in a few days, so that knowing one is almost to know all; only that of the Negrillos is very different, as is the Viscayan in Spain.

From among modern authors we select Don José de Lacalle, who says:[3]

> The Negritos, the aborigines of the islands, speak a language not well known, but which, to judge by its monosyllabic structure and the elements which form it, differs completely from the Malay and reminds us of a primitive tongue.
>
> There is no satisfactory reason for the belief of those who suppose that the Aetas speak different dialects in each one of the provinces which they inhabit. They have one language, and if it has lost its pristine purity this is due to contact with peoples who have come from different places, who have given to each tribe linguistic peculiarities peculiar to themselves.

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[1] The above account of primitive Philippine alphabets has been taken word for word from the paper on Ethnography, prepared for the commission by the Jesuit Fathers. The author of the chapter on Idiomography seems not to know fact that the Tagbanua alphabet is in common use to-day. It is ordinarily written on smooth joints of bamboo, although I have seen paper and pencil used. The characters are placed in vertical columns and are written from below upward and from left to right.—Dean C. Worcester.

[2] See his Relación de los Islas Filipinas, Chapter XV.

[3] See Tierras y razas, p. 246.

Thus it is observed that the Negritos of North Luzon have adopted words and grammatical constructions which differ somewhat from those used by the aborigines who inhabit the mountains of the western region. One and all have followed the law of attraction which so modifies the structure of any language. To-day the aborigines use a modified language, which nevertheless retains the characteristics of another tongue, the key to which might perchance be found among the old Polynesian tongues.

The Jesuit Fathers assure us that the language of the Mamanuas, or blacks, of the island of Mindanao, differs very greatly from all the other languages spoken in that island. They were able to make a comparative study between the Mamanua, the Manobo, and the Visaya, the two languages spoken near it, and noteworthy and radical differences were brought out.[1]

PRIMARY LANGUAGES.

In order to state very briefly how the remaining Philippine languages or dialects are related, we select from among them some of the principal ones, to which the others may undoubtedly be reduced. These are the Ibánag and Ilocano, of North Luzon; the Pangasanán, Pampango, and Tagalog, of Central Luzon; the Bicol, spoken in the southern part of the same island; the Bisaya, which is in use throughout the islands of the same name, and, finally, from among the numerous dialects of Mindanao we take the Moro, Mabobo, Montés, or Buquidnon.

RELATION BETWEEN THESE LANGUAGES AND THE MALAY.

The relationship or resemblance between two or more languages may be sought in two or more ways, either by means of comparison of words or by comparing the grammatical construction. This second method, which modern philologists prefer, evidently does not exclude the former.

Beginning with the first method, we instance a series of words taken from said languages and arranged in columns in order to facilitate comparison. (See comparative table following:)

Nearly all the words contained in this table have a common or very similar root. This is seen not only when the Philippine words are compared with each other, but also when they are compared with the Malay. If, now, we consider the fact that this series might be prolonged until it was two or three times as large, the words always showing the same resemblance, and if, on the other hand, we remember that all the words compared have to do with common things and are of daily use, anyone would note that all of these languages are intimately related, so far as one can judge from a study of their roots.

REPLY TO ARGUMENT.

After what has been said it seems plain that there is little foundation for the opinion of various authors that the Filipinos of the coast region came originally from tropical America. This opinion was founded on the fact that certain Filipino words were found in use among the Americans. In Europe itself there are certain words which are common to many nations which have different origin, and we do not on this account say that their idioms are derived the one from the other.

[1] This special study will appear in the work already referred to on the races of the island of Mindanao.

Comparative table of words.

Castellano.	Tagalo.	Pampango.	Ilocano.	Bicol.	Pangasinán.	Ibánag.	Bisaya.	Moro maguindanao.	Manobo.	Montés.	Malayo.
Yo	Aco	Aco	Siac, ac	Aco	Siac, ac	Ac, sacan	Aco	Ako, saki	Siacon	Siac	Aku
Camino	Daan	Dalan	Dalan	Dalan	Dalan	Dalan	Dalan	Lalan	Dalan	Dalan	Dialan
Luna	Buan	Bulan	Bulan	Bulan	Bulan	Tulan	Bulan	Ulan-ulan	Bulan	Bulan	Bulan
Lluvia	Ulan	Uran	Tudo	Oran	Uran	Uran	Olan	Ulan	Uran	Uran	Udian
Dolor	Saquit	Saquit	Nasaquit	Hapdos	Saquit	Taqui	Saquit	Sakit	Saquit	Saquit	Sakit
Comer	Cain	Can	Can	Cacan	Can	Can	Caon	Can	Caon	Caon	Kan
Beber	Inum	Inum	Inum	Inum	Inum	Inum	Inum	Inum	Inum	Inum	Inum
Arroz	Bigas	Abbias	Bagas	Bagas	Buclas	Bagga	Bugas	Begas	Bigas	Bigas	Bras
Cielo	Langit	Banna	Langit	Lagnit	Taven	Langui	Langit	Langit	Langit	Langit	Langit
Blanco	Puti	Puti	Pudao	Puti	Puti, usiac	Purao	Puti	Puti	Puti	Puti	Putih
Muerto	Patay	Matay	Natay	Gadan	Inatey	Natac	Patay	Minatay	Minatay	Minatay	Mati
Vela de barco	Layag	Layag	Layag	Laoag	Layag	Layac	Layag	Layag	Layag	Layag	Laiar
Viento	Hangin	Angin	Angin	Doros	Dagnem	Padac	Hangin	Endu	Ilangin	Hangin	Angin
Piedra	Bato	Batu	Bato	Gapo	Bato	Battu	Bato	Uato	Bato	Bato	Battu
Árbol	Cahoy	Dutung	Cayo	Cahoy	Guiso	Cayu	Cahoy	Cayo	Cayo	Cayo	Kain
Mojado	Basa	Basa	Basa	Basa	Basa	Basa	Basa	Uasa	Basa	Basa	Bassa
Enfermo	Saquit	Saquit	Saquit	Helang	Saquit	Taquit	Saquit	Saquit	Saquit	Saquit	Sakit
Plata	Pilac	Pilac	Pirac	Pirac	Pilac	Pira	Salapi	Pirac	Pirac	Sapi	Pecra
Caro	Mahal	Mal	Nangina	Mahal	Mabli	Mafuina	Mahal	Marguen	Mahal	Mahal	Mahal
Barato	Mura	Mura	Laca	Sahol	Mura	Mappo	Dili mahal	Lebud	Da mahal	Hari mahal	Mura
Oir	Dingig	Tingid	Dengeg	Dagnog	Denguel	Gina	Dungug	Kineg	Ringig	Paliman	Dengar
Cocer	Luto	Luto	Luto	Loto	Loto	Luto	Loto	Lutu	Lutu	Loto	Masa
Leer	Basa	Basa	Basa	Basa	Basa	Bibic	Basa	Adji	Basa	Basa	Batcha
Puerta	Pintu	Pasbul	Ruangan	Pinto	Pinto	Puerta	Pulta	Pintu	Pulta	Pulta	Pintu
Fuego	Apoy	Api	Dalican	Calayo	Apuy	Afui	Calayo	Apuy	Apuy	Hapoy	Api
Dos	Dalaua	Adua	Dua	Dua	Duara	Dua	Duha	Dua	Dua	Dadua	Dua
Cuatro	Apat	Apat	Eppat	Apat	Apat	Appa	Upat	Upat	Upat	Upat	Ampat
Cinco	Lima	Lima	Lima	Lima	Lima	Lima	Lima	Lima	Lima	Lima	Lima
Seis	Anim	Anam	Inuem	Anum	Anem	Annam	Unum	Anem	Unum	Unum	Anam
Diez	Sampu	Apolo	Sangapulo	Sampolo	Sampolo	Mafulo	Napulo	Sapulu	Sampolo	Sampolo	Sapulo
Cien	Daan	Dinalan	Gasut	Gatus	Lasus	Gattu	Gatus	Gatus	Gatus	Gatus	Ratus
Mil	Libo	Libo	Ribo	Ribo	Libo	Rifu	Libo	Ngibu	Libo	Libo	Ribo

We must also reject the opinion of the Dutch author Riedel, who supposes that the Visayans have a Macassar origin, for, he says, their language has much in common with the dialects of Celebes, but we can not take him seriously, because what he quotes as Tagalog is not Tagalog, nor is what he quotes as Visaya Visaya.

It may be objected to the view which we set forth that if all the Philippine dialects are of Malay origin it would seem that the different tribes which people the Philippines certainly have retained the same language. In reply it may be said, first, that they have retained the use of very many roots, and especially that these dialects have retained, and to-day retain, the same grammatical construction, as we shall see later; second, that if the different Philippine peoples have not preserved in their purity all of the Malayan words which were at first common to them this is due to the fact that the natives of the Philippines are naturally corrupters of language and inventors of new terms, modifying not only the foreign words which they adopt, of which many instances might be cited, but even their own. This latter fact has been verified with reference to words common to many dialects, as well as has the fact that each one of these peoples has given to certain words a distinct signification. There is no need of quoting examples of this, for anyone who has had practical experience will admit it at once. He who lacks such experience might compare the following words: Langam, which in Tagalog means ant and in Visaya signifies bird; cayo, which in Tagalog is cloth and in Visaya is wood. There are other terms which are common to two or three dialects, but not to the remainder.

Other causes which undoubtedly must have a great deal of influence in the modifications which the Philippine dialects have undergone are undoubtedly the wars which the natives have waged against each other and against other races, the mixture with other peoples, the separation or lack of communication between many of the tribes, and their liking for new words.

CHANGES IN THE MALAY.

What may be called a history of the Malayan language will help to make clear the point under discussion. According to the Orientalist Marsden, the first Malays came from the territory of Menangkabao, which lies in the interior of Sumatra between the rivers Djambi and Palembang. From thence came the people who founded the cities of Malacca, Djhor, and Singapore, in the twelfth century, according to the chronicles of Malacca.

According to the same author the Malayan language of Menangkabao is the only one which is not changed, or at least has not undergone any such change as that in other parts of Sumatra, Java, and other Malayan countries.

The Malay may have been at first a mixture of Sanskrit and of the language or dialect of the Samangos, Dayacos, and other blacks of the mountains of Malacca, which mixture may have been brought about after the immigration of the Indians to Java and Sumatra, for the latter island is close to the former, and is encountered before reaching Java when one comes from India. Said immigration, according to Javanese annals, took place seventy-eight years B. C. It is true that in the Malay there are found Sanskrit words, and it is the general opinion that one of the elements which constitute this language is Sanskrit. It appears, then, that the Malays may have introduced various ones of the

few and extremely rare Sanskrit words which are found in the Philippine dialects.

Also the Persa, the Tánul, and other primitive dialects of Java and neighboring regions contributed their share to the enrichment of the Malay.

Later Arabic merchants, who were at the same time apostles of the Koran, introduced various Arabic words having to do with theology, metaphysics, and law.

It is not strange that the Moros of Mindanao have Arabic words. Nevertheless, anyone who knows Visaya will note the moment that he studies the Moro language of Sulu that, with the exception of certain terms taken from the Koran, which are employed in prayers, and certain other words taken from the Malay of to-day, as spoken in Borneo, the Sulu language is simply corrupt Visaya.

AGREEMENT OF THE LANGUAGES SO FAR AS CONCERNS GRAMMATICAL STRUCTURE.

OBSERVATIONS.

What has been said as to the ancient Philippine alphabets, that is to say, that all can be reduced to one in spite of their various differences, may now be applied with equal reason to the Philippine dialects, which we have just discussed, especially if it be found that to the relationship existing between the roots from which the nouns are formed there can be added agreement in the use of particles, formation and character of the nouns, structure of sentences, and the whole grammatical mechanism.

PARTICLES.

The first thing to strike one on examining the morphology of the Philippine languages is the large number of particles, which not only have a common signification when considered as words, but also agree as to the part which they play in the formation of sentences and in the signification which they impart to the roots to which they are united. We will cite only a few, which may serve as examples. Such are mag, um, man, maca, magpa, maqui, ma, magca, magsi, pa, etc., in Tagalog; mag, maqui, ma, maca, ca, ica, paca, pa, maguin, man, etc., in Pampango; um, pag, panag, macapag, maqui, maquipag, ma, pa, paca, mapa, etc., in Ilocano; um, mag, pag, ma, pa, ca, pagca, naca, magpa, maqui, etc., in Bicol; mag, manag, maca, magsi, mangui, man, mi, etc., in Pangasinan; mag, ma, maga, magui, maqui, maca, pa, ca, etc., in Ibanag, etc.

STRUCTURE OF THE NOUN.

If we pass from the particles to the examination of the structure of the noun, we shall see that the greater part of the Malayan roots, which are genuinely so, are of two syllables. This also happens in the Philippine dialects. Those of three syllables are of Sanscrit, Arabic, or other outside origin. Nevertheless, there are in the Malay some words of three syllables, although they are rare, and this also takes place in the case of the Philippine dialects. Furthermore, it forms words of three syllables by means of the interposition of the syllable la, and this also occurs in the Philippine languages. The contractions of the words are also common.

In Malay, as well as in the dialects of the Philippine Archepelago, a root word expresses a generic idea, which is limited and particularized by the employment of particles, prefixes or suffixes, or by the place which it occupies in the phrase. The Malay like the Filipino forms his derivative words, first, by the application of particles, prefixes or suffixes, or by two of them at once; second, by the reduplication of the root; third, by the union of two words.

With the particle an as a suffix, there are formed in Malay and in the Filipino language, first, verbal substantives; second, nouns which indicate the quality of the object; third, collective or generic nouns; fourth, nouns indicating place.

With the particles *CA* as a prefix and *AN* as a suffix there are formed nouns which have the value of adjectives as well as substantives, which indicate what is expressed by the adverb.

There is also noted conformity in the gender of nouns, in the way of forming plurals in what pertains to the cases (which, properly speaking, none of them have); in numbers; personal, relative, possessive, and demonstrative pronouns, etc., in the adjectives which are formed from them; and, finally, in the comparative.

FORM OF THE VERB.

As for the verb, the Malayan language, like the languages of the Philippines, has the peculiarity that its roots when used as verbs are not subject to inflection nor change of termination of any sort in order to designate the form which the verb may take. The active, passive, causative, frequentitive, and reciprocal are determined by means of particles. It is also common that verbs may be formed from simple substantive adjective or adverbial root. Finally, the Malays, like the Filipinos, make much more use of the passive than of the active voice, both in spoken and in written language.

In proof of all that has been said numerous examples might be cited, but space does not permit.

CONSTRUCTION OF SENTENCES.

A notable confirmation of the linguistic harmony for which we have been arguing is found in the fact that the grammatical structure of sentences has remained the same in all the dialects, both of those who people the shores and of those who inhabit the forests of the interior. What this form is may be seen from the following comparative table of grammatical constructions:

Comparative table of sentences.

Tagalog	Passive in An	Pinañgañgaco*an* acó nia nang isang maputing gamot = He promised me a good medicine, or A good medicine was promised me by him.
	Passive in I	*I*binigay co yaon baril sa cania = I gave him that rifle, or That rifle was given to him by me.
	Passive in In	Tauag*in* mo sia = Call him, or Let him be called by you.[1]
Pampango	Passive in An	Salgaban*an* mon palay itang labuad = Sow rice in that land.
	Passive in I	*I*bili me iyang calis = Drop that sword.

[1] The remaining sentences will be translated only in the active form.

Comparative table of sentences—Continued.

Ilocano	Passive in An	Danum*an* da iti inapuy = Let them put water on the boiled rice.
	Passive in En	Lualu*en* na ti rosario = Let him count the beads of his rosary.
	Passive in I	*I*ditoy mo dayta = Put that here.
Bicol	Passive in An	Tumang*an* mo siya = Resist him.
	Passive in I	*I*binugtac nia ang bagas digdi = He put the rice here.
	Passive in On	Sabih*on* mo sa iya na pumadigdi = Tell him to come.
Pangasinan	Passive in An	Pinuesa*can* moy cases ed pila = Wash the clothes in the trough.
	Passive in En	Dalasen coy Juan = I shall visit John.
	Passive in I	*I*puesac coy caoes ed pila = Take the clothes to the trough to wash.
Ibanag	Passive in An	Sinudd*uan* na-c = He was taught. Baballay*an* nu yau = Divide this.
	Passive in I	*I*ballao nu pa sa si Jose = Give a part to Joseph. *I*pagcunas i ma-c = Give memories from me (i. e., Remember me to them). *I*tububu nu yao = Throw that away.
Visaya	Passive in An	Si Juan ang acong guisultih*an* = He spoke to John.
	Passive in I	*I*luan mo quini sa sacayan = Load this in the boat.
	Passive in On	Bubuhat*on* co quini = He will do this.
Moro Maguindanao.	Passive in An	Inifigay*an* acó isa a pilac = They gave me a dollar.
	Passive in I	*I*calimo co salku a tanto = I like you very much.
	Passive in In	Ti*n*angak nilan su paca en = They carried off my friend.
Manobo	Passive in An	Bugay*an* co din ta ludio = I will give him the machete.
	Passive in I	*I*indan canio ta candan sa nio a ocuman = Tell them our customs.
	Passive in On	Pudut*on* nio sa diloc ta amay nio = Take your father's lance.
Montés	Passive in An	Ilah*an* mo sia ta sulat = Give him the letter.
	Passive in I	*I*ugsac mo ito coon = Put this there.
	Passive in On	Ouit*on* nia iyan tagbis ta candin = Take him this bird.

Comparison with the Malay.

1. Radical passive in Malay.	Kenal-i uleh Kapala siapa itu.	You should know whose is this head.
Same in Tagalog.	Quilala mo canino baga itong olo.	You should know whose is this head.
Same in Visaya.	Ila mo cunquinsa guining olo.	You should know whose is this head.
2. Passive, with prefix Di in Malay.	Di pukul hamba	He is struck by me.
	Die angkat hamba	It was taken by me.
Same by the insertion of *in* in Tagalog.	Binobono co	He is struck by me.
	Dinala co	It was taken by me.
Same with prefix *qui* in Visaya.	Guibono co	He is struck by me.
	Guidala co	It was taken by me.

Comparison with the Malay—Continued.

3. Passive in *An* in Malay.	Aku kudatangan suatu pekanja-*an* lyang amat meskil.	I am the one to whom has come a bad piece of business to attend to.
	Ada pun kanaik*an* raj Suran gajah.	The animal ridden by the King Suran was an elephant.
Same in Tagalog.	Ácó ang inaabut*an* nang masamang gagauin.	I am the one to whom has come a bad piece of business to attend to.
	Ang sinaqui*an* nang Hari, i cabayo.	The animal ridden by the King was a horse.
Same in Visaya..	Ácó ang guiabutan sa dautan ñga bubuhaton.	I am the one to whom has come a bad piece of business to attend to.
	Ang guisaquian sa hari cabayo man.	The animal ridden by the King was a horse.

This proves the harmony between the languages or dialects of the Philippines, which in their origin must have been one, since in essentials they are agreed, even as they are spoken to-day. Other races, curiously enough races of Mindanao, preserve the same form of sentence, so it can not be doubted that all of the Filipinos speak in this way. If anyone should desire to know, for instance, how the Tirurayes and the Sulu natives express themselves, here are examples:

Tiruray	Passive in An.....	Nirray*an* u Sebaan pilac=They have given me a dollar.
	Passive in En.....	Uit*en* mu ini sulat=Carry this letter.
	Passive in *On*.....	Nohoc*on* i fautad=The earth was planted.
Sulu-Moro.....	Passive in An.....	Dihil*an* acu nia hambue pilac=Give me a dollar.
	Passive in I.....	Biutang cu ing sulat ha taas la mesa=He put the letter on the table.
	Passive in Un.....	Daah*un* mu ing sulat ini=Carry this letter.

It has been shown then that, with the exception of the Negrito, the primary language of the Philippine Archipelago was but one, and that derived from the Malay.

CONFIRMATIONS.

We can now cite in confirmation of this conclusion the authority of many authors who have found for these languages the same parentage which we have assigned them. After Father Hervás y Panduro, a highly educated Spanish Jesuit, published during the last century certain works which are still admired by scientists, using the new comparative method which is to-day preferred in philological investigations, and computing that the Philippine languages are dialects of the Malay, other philologists who have come later, with few exceptions, have been and still are in accord that this assertion is true. After consulting Hervás on this point Father Francisco García de Torres, who knew well many Philippine languages, replied to him in 1784, with these words, among others:[1]

I agree with you in believing that almost all the dialects of the Philippine Islands and of other islands near them are dialects of the Malayan language which is spoken in Malacca.

[1] As he states in his work, Catálogo de las lenguas, Vol. II.

CONCLUSION.

If one thinks of what might be said the consideration which we have given the matter of the idiomography of these islands is very brief, especially when one remembers how numerous are these languages or dialects and how little known are many of them. But the nature of this treatise does not demand more and, on the other hand, we believe that what has been said is sufficient for our purpose of making clear and confirming the point which we set forth in the beginning as to the origin of the tribe. As a matter of fact, the harmony which exists between nearly all of the Philippine languages is such as to reduce them to a single one closely related with the Malay, which leads to the conclusion that this is or comes from the Malay itself, modified and changed as we have seen. This conclusion is deduced from the ancient alphabets, the common roots, and the analogy in grammatical construction, and is in perfect accord with the conclusion reached in the chapter on ethnogeny.

As these languages are closely related to the Malay which is spoken from Madagascar and Aden throughout Malasia to the confines of the Indian Ocean, the Philippine peoples also, with the exception of the Negritos, were derived in great measure at a more or less remote time from the Malayan stem.

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